Railway Engineering and Maintenance

PROVED PERFORMANCE

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HEADFREE 100% JOINTS

on the ERIE

Original joints installed in 1929. These joints have carried over 300 million tons and same still in track.

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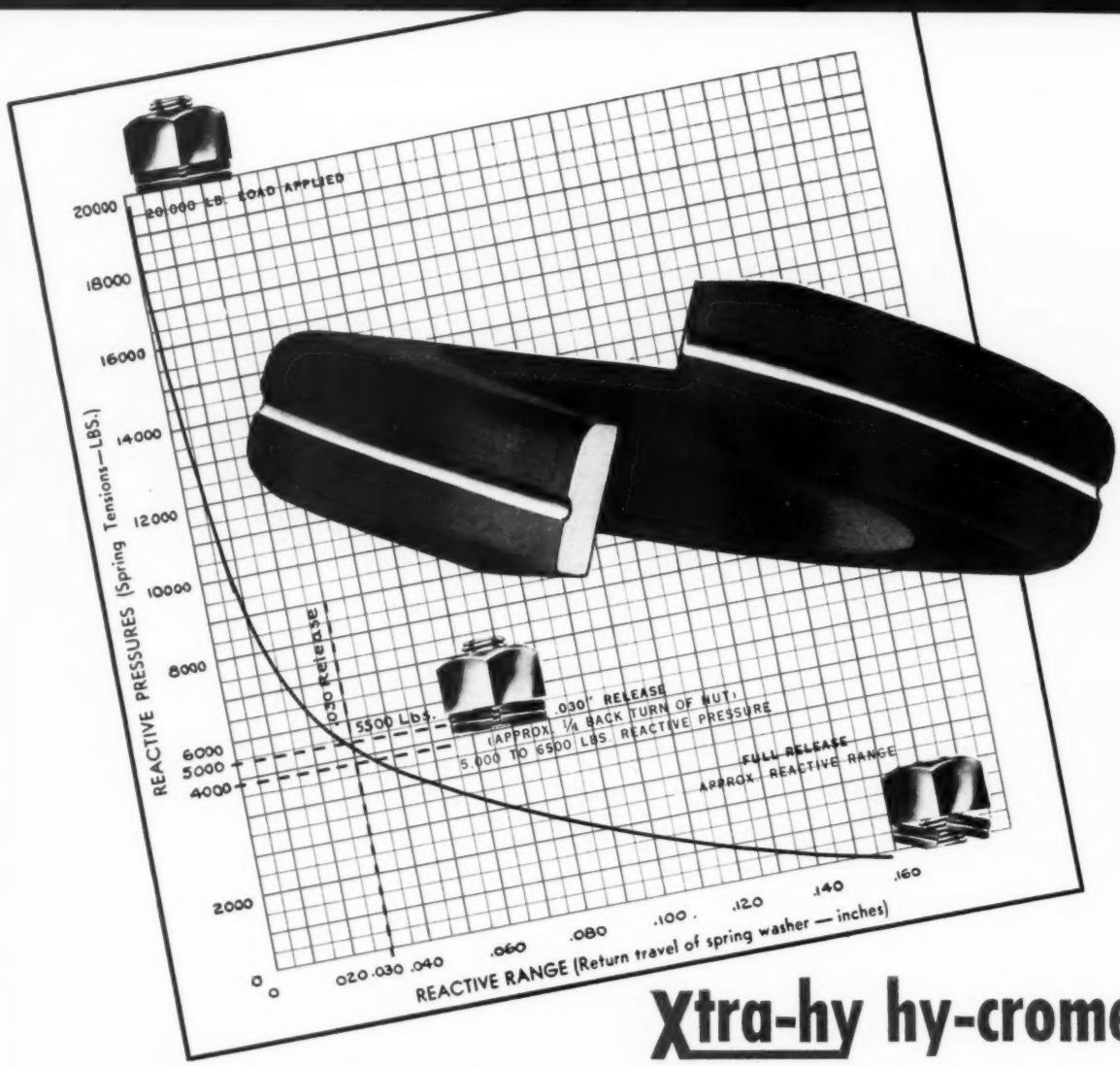

Xtra-hy hy-crome

the most efficient spring washer for 1" thread diameter track bolts

Xtra-hy Hy-Crome Spring Washers safely exceed the new A.R.E.A. specifications for the one-inch track bolt and possess a longer reactive range from compression to extended free height.

Reliance Xtra-hy Hy-Crome Spring Washers are designed to fit the splice bar wherever Reliance Hy-Pressure Hy-Crome Spring Washers have been used. They require no increase in bolt length, yet give reactive pressure plus to compensate for dimensional changes in the rail-joint assembly produced by modern heavy freight and passenger trains with heavier wheel loads and faster speeds passing over the rail joint. To keep rail-joint bolts *tighter longer* specify Reliance Xtra-hy Hy-Crome Spring Washers for one-inch track bolts.

Maintenance Engineers, be up to date; write for information on this new track spring washer.

Reliance Xtra-hy hy-crome *spring washers*

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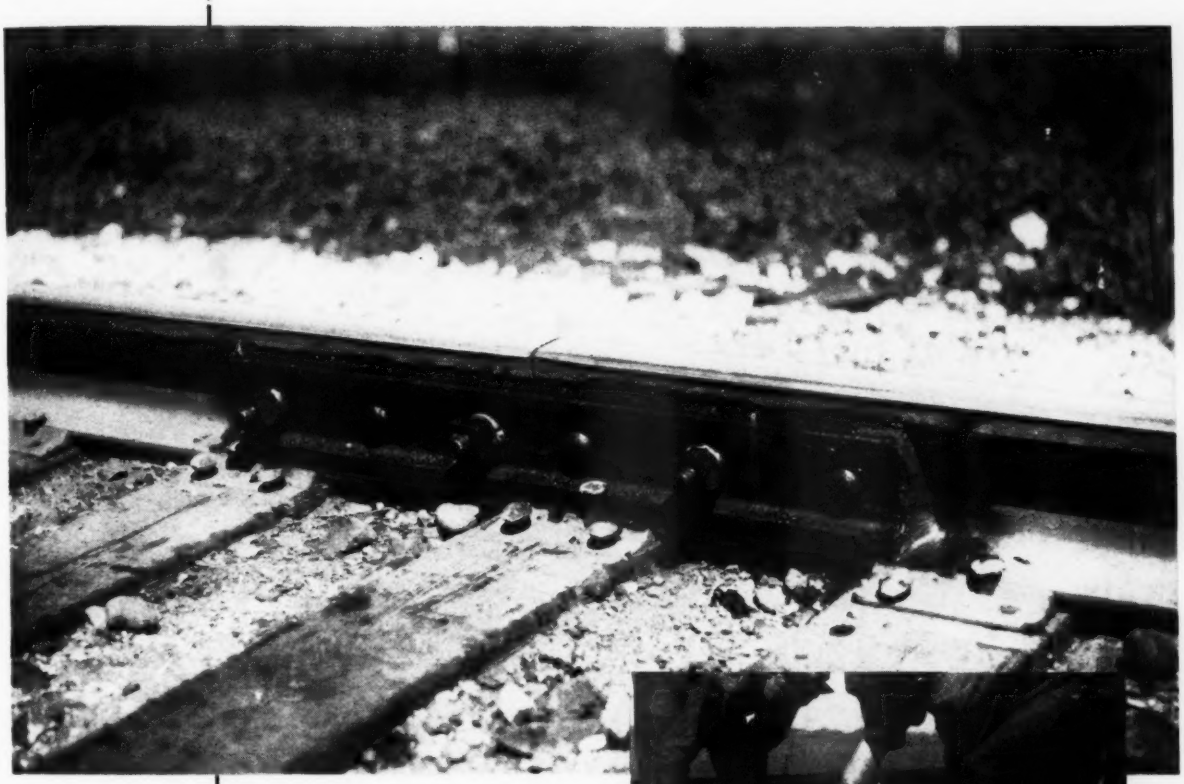

Workmen apply NO-OX-ID "A" Special to rail joint assembly. Coating prevents "freezing," also serves as joint lubricant.

It's so easy to be certain of sealed-in protection for rail joints. First apply NO-OX-ID "A" Special to rail ends, angle bars, track bolts. After the joint is assembled, plug open ends of bars with new NO-OX-ID Joint Bar Filler. Metal loss, due to abrasion and corrosion, stops. Sand and grit are excluded, underfilm corrosion is inhibited. The entire joint assembly is sealed against moisture, cinders, brine . . . all corrosion accelerators. Send for descriptive circular with complete information.

Placing NO-OX-ID Joint Bar Filler behind bar end with marginal trowel . . . "sealing in" protective benefits of NO-OX-ID rust-preventive coating and joint lubricant.

NO-OX-ID RUST
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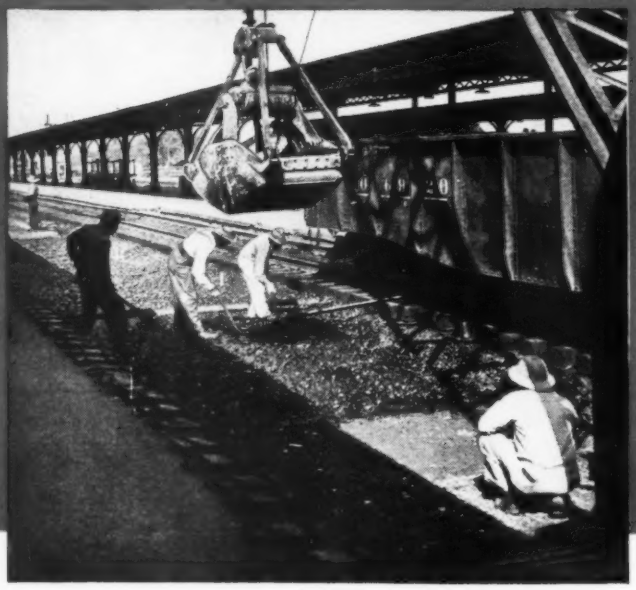
CHEMICAL COMPANY

Dearborn Chemical Company
Dept. U, 310 S. Michigan Ave., Chicago 4, Ill.
New York • Los Angeles • Toronto

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.

difficult drainage problem SOLVED!



Station track maintenance costs greatly reduced by coating ballast with Texaco Asphalt

THIS is a true story of certain station track that had to be completely rebuilt every summer — until, nine years ago, it was rebuilt with a coating of *Texaco Asphalt* on the stone ballast.

Since then, the only maintenance necessary has been minor repairs. The track has stayed in line and on grade. Water sheds quickly off the *Texaco Asphalt* coating . . . there has been no serious fouling of ballast . . . no heaving during the winters.

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Northwest loads and unloads under its own power either on a standard flatcar, drop-end gondola or heavy-duty trailer.

Put it over the road to the job or put it over the line. Unload it at the job. Work on the line or off. Handle a wide range of equipment—pile driver, tie tongs, clamshell, pipe hook, hook block, dragline bucket, magnet, anything that can be hooked to the end of a cable—and when real digging has to be done convert it quickly to a standard shovel by simply changing booms. Here is the real *fast* answer to ditching, building out shoulders, bank trimming, bridge work, relocation jobs, shortline and sidetrack construction and hundreds of other jobs that face your department. These jobs are the heart of your maintenance-of-way program and you can't afford to have anything but the best for the *Key Spots* at the heart of the job.

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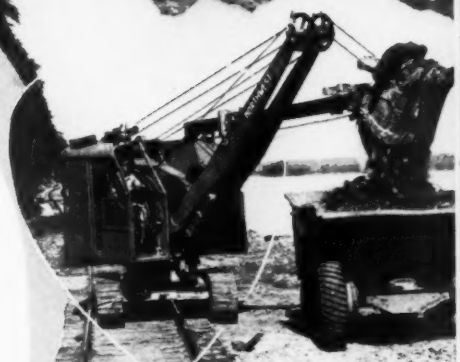

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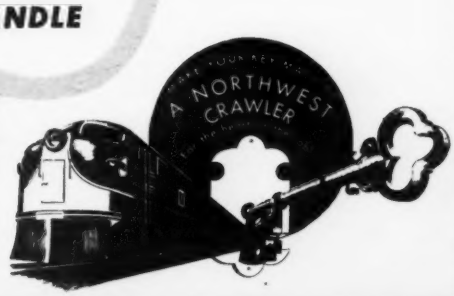

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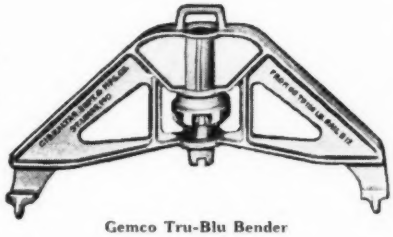
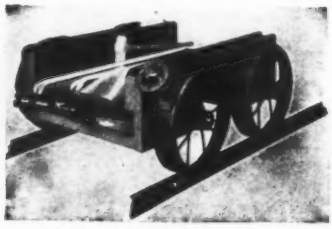


Gemco Tru-Blu Bender



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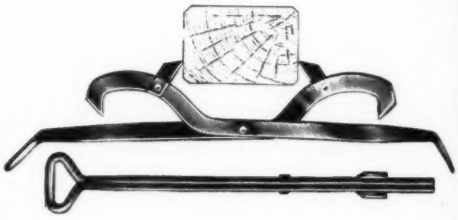

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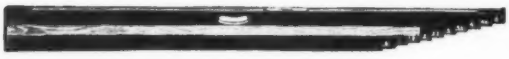

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Don't 'Ride' Em out of town on a Rail'

Use P&H welding electrodes to smooth out your trackwork and build passenger satisfaction

Smooth track also reduces equipment maintenance costs

In frontier days, being ridden out of town on a rail was rough punishment. People won't stand for it today. This is especially true of your passengers — they want comfort, speed, safety, and service.

A quick, easy way to start providing comfort, speed, and safety is to build up battered rail ends, worn frogs, crossovers, etc., with P&H electrodes. You benefit two ways: Passengers are satisfied, and costs for equipment maintenance are reduced.

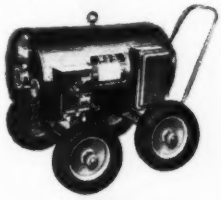
Here are two electrodes that are ideally suited for smoothing out your track and maintenance problems:

Harcote 35 provides abrasion- and shock-resistant welds on high carbon steels — Because of the speed and ease with which this electrode can be applied to high carbon steels, it has become a great favorite with railroads throughout the country, for building up worn rail ends. It can be used on AC and DC welders, has a Brinell hardness of 375.

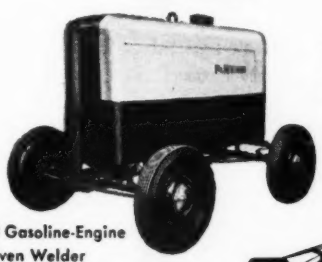
Harnimang A makes possible impact- and abrasion-resistant build-up welds on manganese steel. This nickel-manganese electrode gives you welds of high tensile strength and ductility. It work-hardens to 495 Brinell. That is why many railroads have found Harnimang A especially suitable for reclaiming frogs and other types of manganese steel trackwork. This electrode can also be used on either AC or DC current.

Yes, you can make things easier for your passengers, equipment, and work crews by maintaining your track with P&H electrodes. Let your nearest P&H representative show you why. Write us for latest bulletins.

Build-up Weld on a Manganese Frog.



WSR 500 DC Welder
60 to 500 amps.



WN 300 Gasoline-Engine Driven Welder
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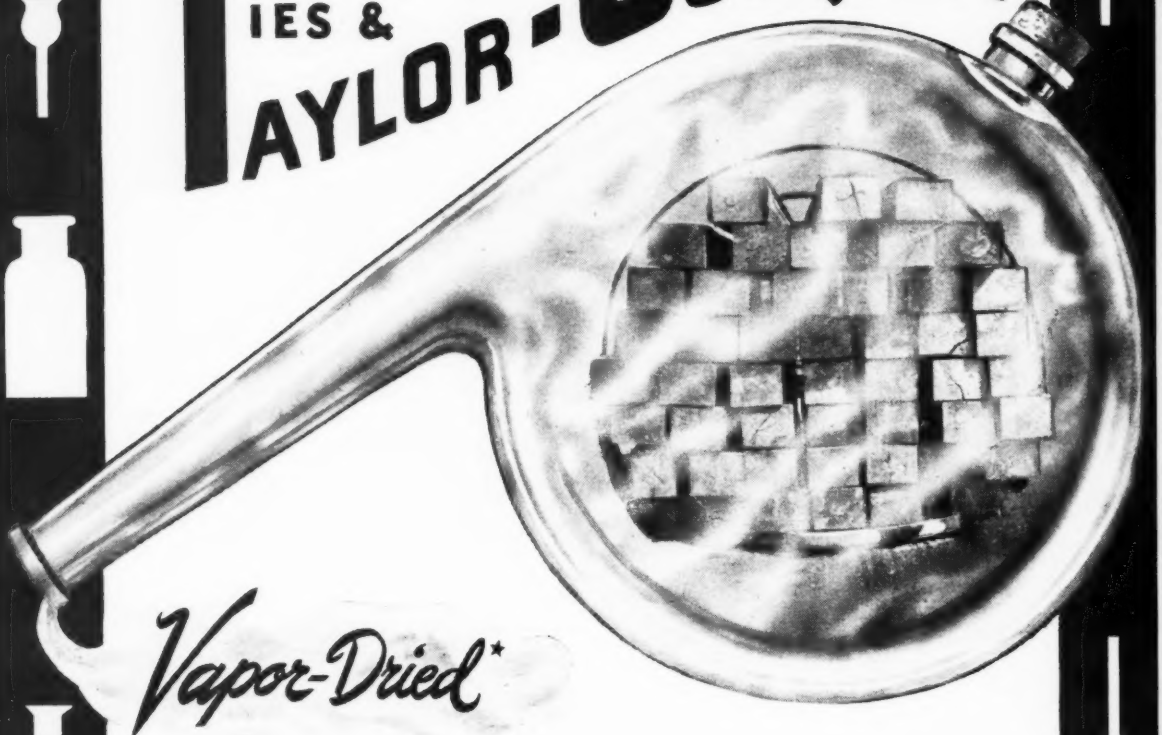

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Every Industry Must Invest in Research, Not Only to Grow and Prosper, But to Stay Alive and Progress

TAYLOR-COLQUITT CO. firmly believes this and consequently maintains a modern, competently staffed Research Department. On every hand intensive studies are under way in an effort to prolong the life of crossties. Consumers, producers and treaters each in his own way is thereby contributing his part toward the conservation of our forest products.

Ties from test tubes? Well, it may seem fantastic, but Vapor-Drying is real, it's here, and it was developed after years of research in our own Laboratory. It not only provides a better tie, but it makes available for crossties, other species, having excellent strength properties and wear resistant qualities that have heretofore been considered unsatisfactory because of their tendency toward early decay, excessive splitting and checking, and other defects.

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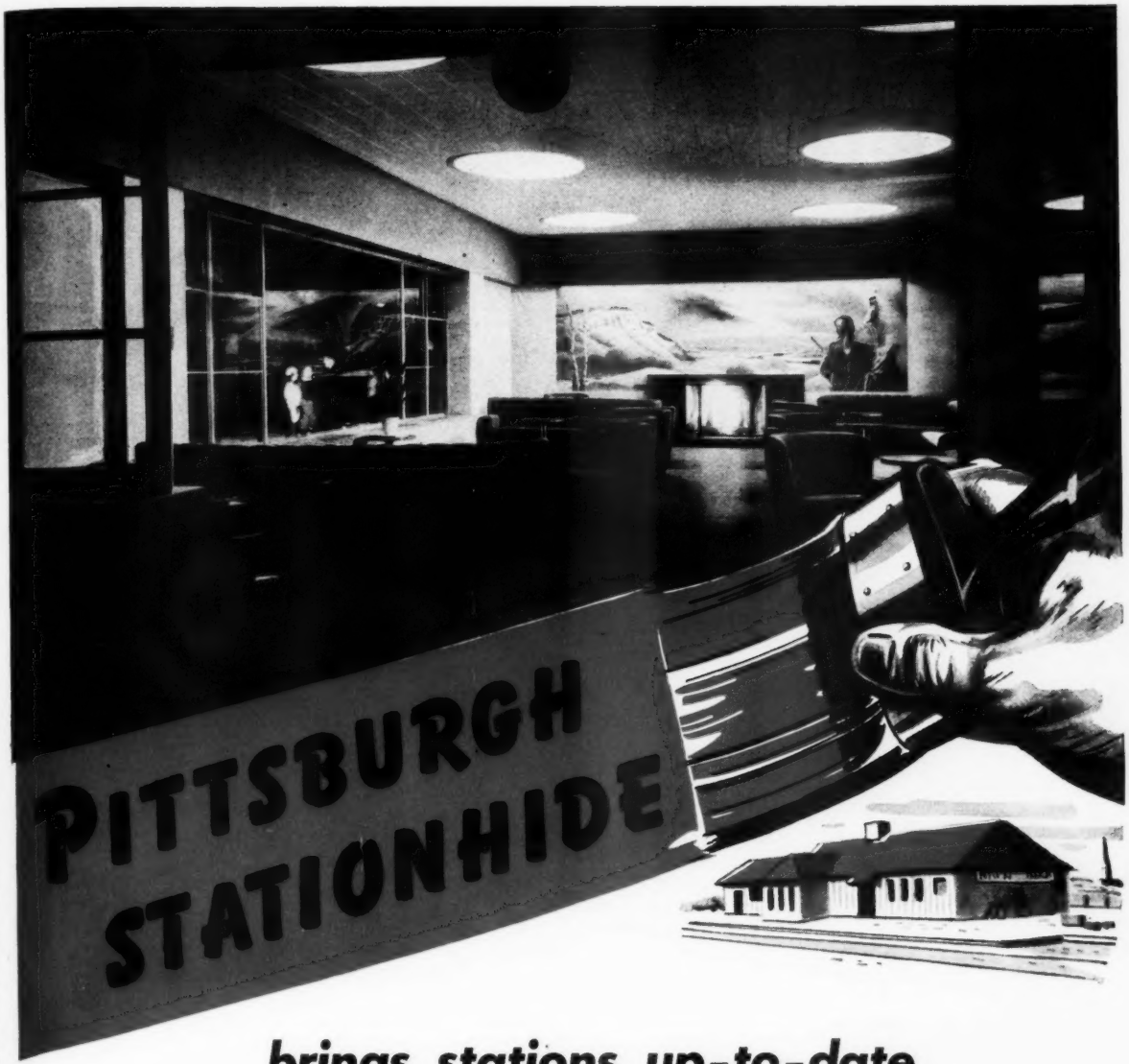

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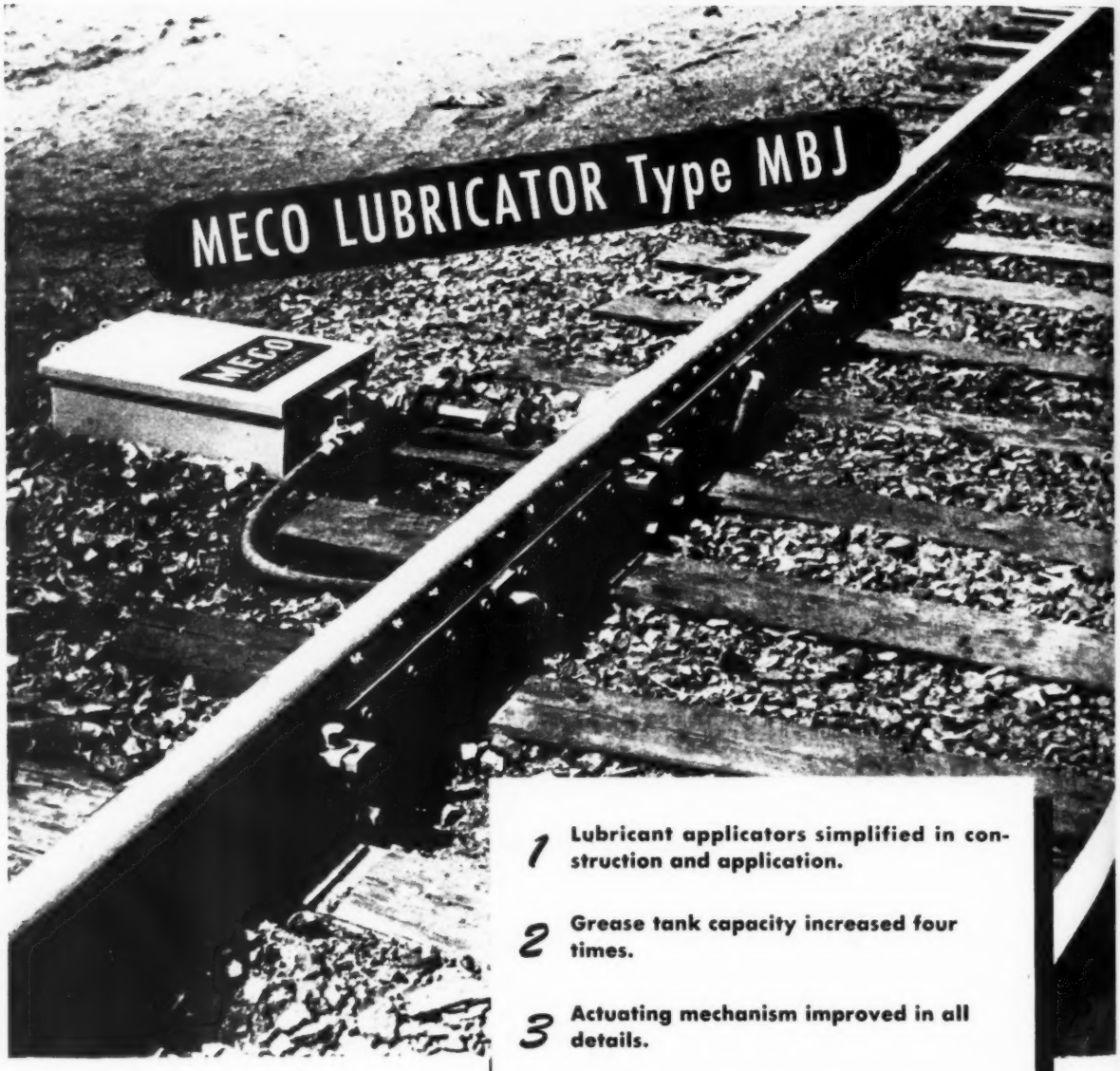

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Here's how Blue Brute Track Teams cut the time and cost of maintenance for one of the country's heaviest-hauling railroads.

The Detroit, Toledo & Ironton has found that the tough, power-packed Blue Brute Railroad Hand-I-Air Compressor . . . though easily transported by two men . . . delivers an *unfailing* supply of air for four WTT-7 Blue Brute Tie Tampers . . . 60 cubic feet per minute through its light, tight, easy-breathing Feather* Valves.

D. T. & I. men also know that the 42-lb. WTT-7's are easy on the operator and precision-balanced for smooth, trouble-free action . . . while improvements like the leak-proof throttle and anti-freeze design assure peak performance under all conditions.

Blue Brutes like these are doing faster, better surfacing for railroads all over the country — and cutting costs every foot of the way. Why not investigate how they — and their many other Blue Brute team-mates — can save time and money in your own maintenance work?

*Reg. U. S. Pat. Off.

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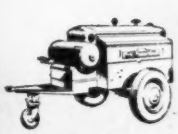

60' Portable Compressor

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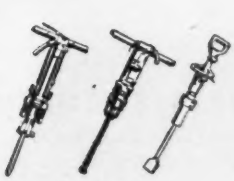

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Railcar Compressor

FOR EVERY CONSTRUCTION AND MAINTENANCE JOB

The improved

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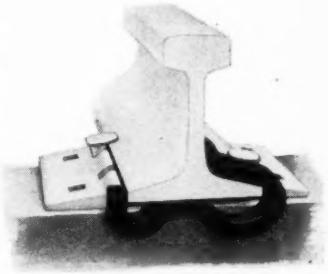
ALL OTHER things being equal, most track men prefer a one-piece rail anchor that can be applied with a handy tool such as a spike maul. The Improved Gautier is this type of an anchor with the added and most important feature—*it can't be overdriven.*

This exclusive development, when considered in conjunction with its demonstrated ability to anchor rail under all types of track conditions, places the Improved Gautier Anchor in the position of being the outstanding rail anchor available today.



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It paid for itself in four years!

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SAVINGS IN FUEL PER DAY $13.40
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TOTAL FUEL AND LABOR SAVINGS PER YEAR.. $7,514.00

AND WE INCREASED OPERATING TIME BY 65 DAYS A YEAR!

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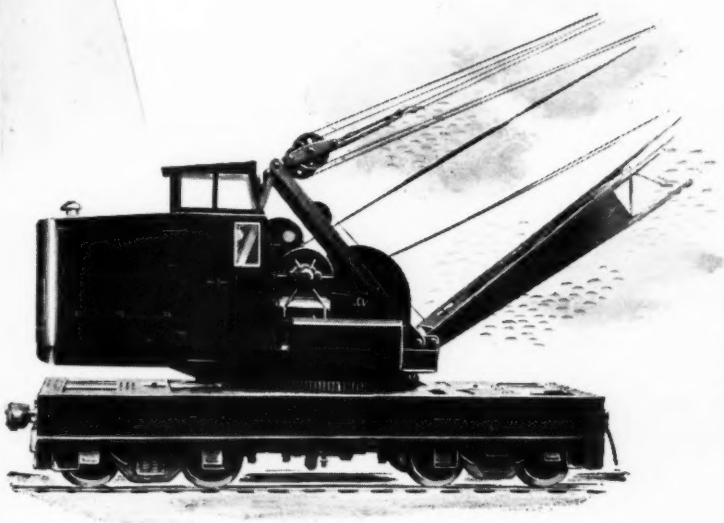

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Safer, cleaner operation; greater production and less operator fatigue because of air operated controls; reduced maintenance time, about one-half that of steam, and elimination of smoke nuisance and fire hazard. Write today for complete information.

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FRISCO uses another famous "LINE"...

for DEPENDABLE MATERIAL HANDLING SERVICE

FIND a fast moving construction job along the Frisco right-of-way and you'll find a Lorain at work. Pictured at top is the newest addition to the family—a ½ yd. TL-20 Moto-Drag. Shown below are a ¾ yd. Lorain and a 2-yd. Lorain-820—both seasoned members of the Frisco construction force.

These three machines are a representative cross-section of the complete Lorain line—the "TL-20 series" in the ½ yd. class, the "Lorain-41 series" in the ¾ yd. class, and the "Lorain-820 series" in the 2 yd. class. There's a size and type Lorain for every railroad construction and maintenance service. Units in the ½ and ¾ yd. classes are available with either crawler or rubber-tire mountings. And every unit is fully convertible to shovel, crane, clamshell, dragline or hoe operation. Your local Thew-Lorain distributor will gladly supply complete product data. Write or call him now.

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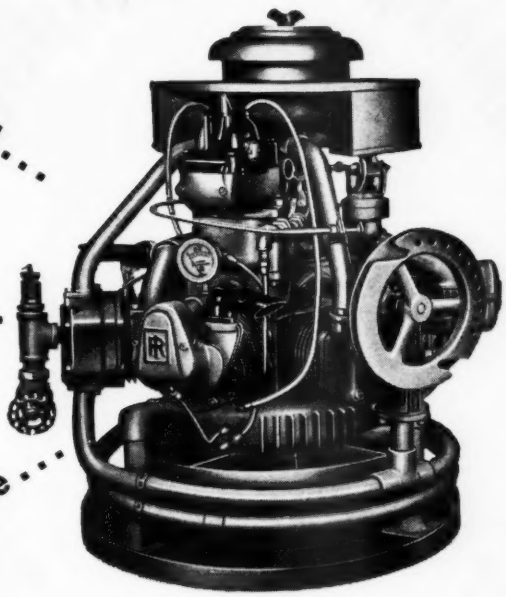
THE IDEAL SECTION-GANG *Compressor*

air to tighten track bolts . . .

air to grind . . .

air to tamp . . .



air to spike . . .

air to paint . . .

air to break ice . . .

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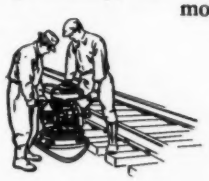
THERE'S NO OTHER COMPRESSOR LIKE IT . . .

The new SPOT-AIR Compressor is Ingersoll-Rand's latest contribution to the field of railroad maintenance equipment. This little gasoline-powered unit is the lightest and most compact section-gang compressor yet developed.

It can be easily carried by two men or moved from job to job on a section car. For even greater portability, the rubber-tired wheelbarrow type mounting makes it possible for one man to transport the SPOT-AIR *and* Air Tools.



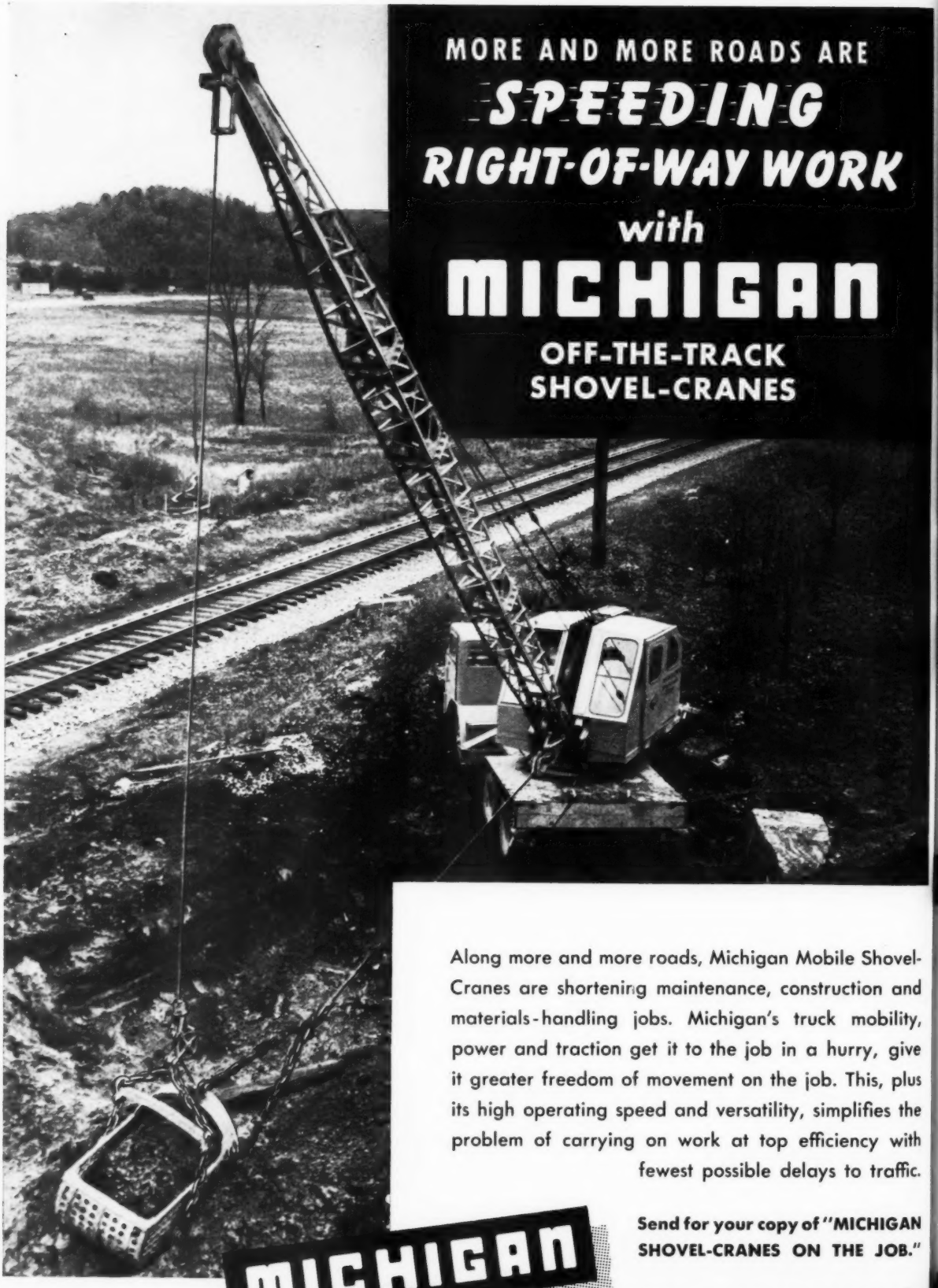
In addition to being able to run two I-R tie-tampers, the SPOT-AIR is ideal for operating Ingersoll-Rand's drills, grinders, impact wrenches, paving breakers and many other I-R Air Tools. You'll find innumerable uses for it on all types of jobs.

For full information on the remarkable SPOT-AIR compressor, and I-R Track Tools, write or phone any of Ingersoll-Rand's twenty-six Branches, located in all the larger cities.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 222-11

ORIGINATORS OF THE MECHANICAL TIE TAMPER



MORE AND MORE ROADS ARE

SPEEDING RIGHT-OF-WAY WORK

with

MICHIGAN

OFF-THE-TRACK SHOVEL-CRANES

Along more and more roads, Michigan Mobile Shovel-Cranes are shortening maintenance, construction and materials-handling jobs. Michigan's truck mobility, power and traction get it to the job in a hurry, give it greater freedom of movement on the job. This, plus its high operating speed and versatility, simplifies the problem of carrying on work at top efficiency with fewest possible delays to traffic.

Send for your copy of "MICHIGAN SHOVEL-CRANES ON THE JOB."

MICHIGAN

MICHIGAN POWER SHOVEL COMPANY
400 SECOND STREET, BENTON HARBOR, MICH., U. S. A.

B. & O. Bridge, Loogootee, Indiana, before and after being repaired by the Non-Shrink Embeco Repair Method. One of many Embeco repair jobs done by George E. Detzel Co., Cincinnati, Ohio, Restoration Contractors.

Non-Shrink EMBECO Repairs Assure Many Additional Years Service

Cost-minded railroads that want to keep down maintenance expense are bringing their properties up to the requirements for safe, adequate and modernized transportation by the Non-Shrink Embeco Repair Method.

By eliminating all shrinkage in mortar and grout, Embeco insures a strong bond and long-life repairs. Non-Shrink Embeco has been successfully used for fifteen years for grouting bridge, turntable and heavy machinery bed plates, repointing old stone structures, reintegration of concrete masonry piers and abutments and the application of gunned concrete for tunnel lining, repairing and retaining walls, dams, abutments and piers.

EXHIBITOR BRIDGE & BUILDING TRACK SUPPLY ASSOCIATIONS HOTEL STEVENS CHICAGO SEPT. 20-21-22 1948

Write for full information.

MASTER BUILDERS

CLEVELAND 3, OHIO TORONTO, ONTARIO

We regret the present extended delivery schedules due to the steel shortage, but you will find Monotube Piles well worth waiting for.

For projects ahead . . .

Plan on

MONOTUBE Foundations

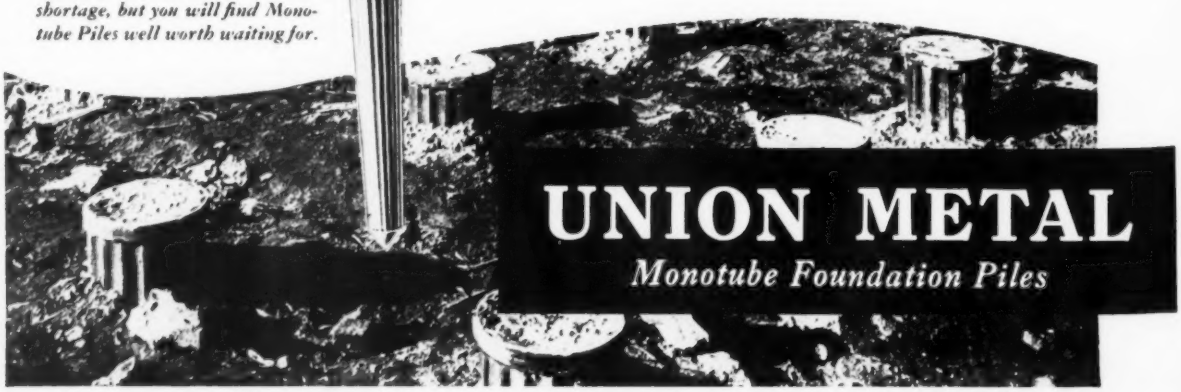
for time and cost savings

FORWARD-LOOKING engineers and builders are planning *now* to use Monotube tapered steel piles for their future construction projects.

They know from successful experience that Monotube foundations save time and money, because . . .

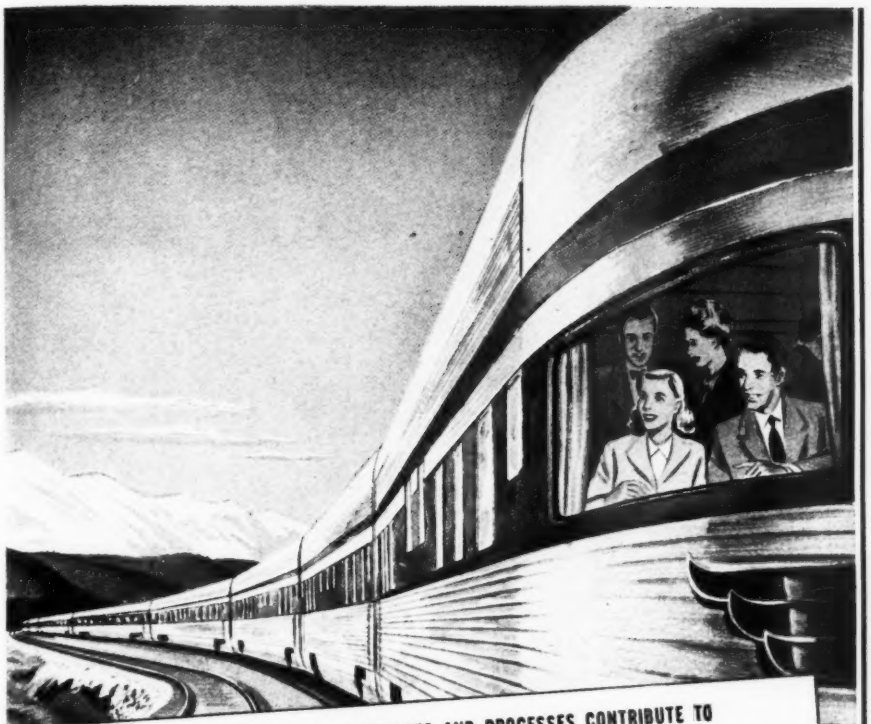
Monotubes are light in weight, easily and quickly handled; their fluted, tapered design speeds driving; they are easily extendible, right on the job; their sturdy construction makes it possible to eliminate use of a driving mandrel; Monotubes' tubular construction makes inspection, before concreting, quick and easy.

Plan your requirements for Monotube steel piles well in advance. Gauges, sizes and tapers to meet varying soil conditions. For complete information, write The Union Metal Manufacturing Co., Canton 5, Ohio.



UNION METAL

Monotube Foundation Piles



HOW UNION CARBIDE'S PRODUCTS AND PROCESSES CONTRIBUTE TO TODAY'S BETTER RAILROADS

TRAINS AND RAILROAD EQUIPMENT	ALLOY STEELS	INDUSTRIAL GASES	PLASTICS	CHEMICALS	CARBONS
SAFETY	x	x		x	x
COMFORT	x	x	x	x	x
ECONOMY	x	x	x	x	x
SPEED	x	x		x	x
STRENGTH	x	x			x
BEAUTY	x		x	x	x
QUIETNESS		x			x
CLEANLINESS	x		x	x	x
OVERALL EFFICIENCY	x	x	x	x	x

They go Hand in Hand

Just take a look at a partial list of the products and processes—that go into modern railroading.

Then compare the speed, power, comfort and safety of today's sleek streamliners, for example . . . with the first train that chugged bravely out of Chicago 100 years ago.

Progress? *Yes.* Progress spurred on through a century of research in better designing . . . in developing newer methods . . . in the production of better materials . . . in improved engineering and service. And each contributes in a variety of ways to our modern rail transportation.

The people of Union Carbide create, develop, and provide these better materials and methods . . . that help make today's transportation faster, safer, more comfortable . . . and are contributing ever more to the progress of this and many other industries.

HOW UNION CARBIDE HELPS THE RAILROADS

INDUSTRIAL GASES. With oxygen, acetylene and other products the railroads are brought the advantages of the oxy-acetylene processes and methods for welding, cutting, and treating of steel and other metals. Equipment and track are kept in repair and protected from wear. Rails are pressure-welded into mile-long continuous units . . . for longer use, added comfort, and safety.

ALLOYS AND METALS. Stainless steel brings streamlined speeds . . . plus long-lasting corrosion-proof beauty. Vanadium alloys toughen locomotive parts and give extra safety. Other alloys and special metals stand up under extreme shock, heat and abrasive action . . . and give added resilience to car springs for easier riding comfort.

PLASTICS. Colorful plastics go into sleek interior finishes, upholstery and accessories . . . that are restful and stay "like new." Plastic insulated wiring is ultra-thin, flexible, safe. Plastic resins bond together the new fiber insulation . . . for heat control in passenger and refrigerator cars. And new revolving brushes, molded of plastic, clean trains in *1/10th* the time it took before.

CHEMICALS. Synthetic organic chemicals — alcohols, acids, anhydrides and other compounds—go into today's better oils and lubricants. They help prevent corrosion in steam boilers . . . and are vital to shatterproof glass. They are basic to modern jiffy-quick cleansers . . . and give the new paints, lacquers and other protective coatings eye-appealing "tone" . . . and resistance to wear and weather.

CARBONS AND BATTERIES. Without carbon brushes no electric motor or generator — from the tiniest to the largest — would turn. And railroad signal-control apparatus depends on carbon in the contacts. Carbon electrodes, too, used in electric furnaces, produce top-quality steels and alloys for today's railroads.

UNION CARBIDE
AND CARBON CORPORATION

30 EAST 42ND STREET UCC NEW YORK 17, N. Y.

DUFF-NORTON TRACK JACKS are easiest to operate

ASSURES QUICK, POSITIVE, SMOOTH OPERATING ACTION

Duff-Norton Jacks are favorites with section gangs for maintenance, surfacing and lining of heavy track. Less jacking effort is required—tripping is quick and positive with spring actuated pawl—and these jacks are more economical since all parts except housing and lifting racks are interchangeable. Why not give your workmen and your road the benefits of these high quality jacks—always specify Duff-Norton.

QUICK REFERENCE DATA ON TRACK JACKS YOU NEED!

Jack No.	Capacity Tons	Height Inches	Raise Inches	Base Inches	Head Inches	Foot Lift Ht. Inches	Weight Pounds
117	15	22	13	6½x11	3x3	2	60
117A	15	22	13	6½x11	3x3	2	42
217	15	16½	7½	6½x11	3x3	2	52
617	15	28	18½	7x12	3x3	2	75
517	15	11	5	6½x10¼	3x3	2	40

Write today for complete catalog on Duff-Norton Jacks

65th Anniversary

THE DUFF-NORTON MANUFACTURING CO.

"The House that Jacks Built" • **PITTSBURGH 30, PA.**

THE WORLD'S LARGEST AND OLDEST MANUFACTURERS OF LIFTING JACKS

THIS RIC-WIL *Copperclad* LINE GOES OVER THE TOP...

Foilclad Units for 62 ft. riser were connected on ground and hoisted into place.

TO IMPROVE STEAM SUPPLY

To meet operating demands for an adequate supply of process steam the engineers of Canada Packers, Ltd., Toronto, installed this new over-the-top steam line. Made up of 550 lineal feet of 8 inch pipe, it is designed to carry 80,000 pounds of steam per hour at 150 psi, 366°F.

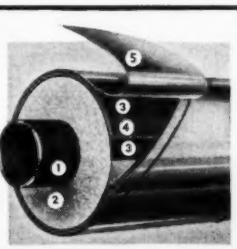
The line connects to a supply system running underground and rises vertically to form a huge expansion loop supported on the roof. Desired flexibility is obtained by shaping the structure to conform with roof contour and changes of roof elevation. The vertical pipe tangents absorb horizontal movement of the line due to expansion, while horizontal tangents perform a similar function with respect to vertical movement.

As specified, Ric-wiL pre-fabricated, pre-insulated Copperclad Piping was furnished in 21 foot tangents and elbow units, minimizing field erection costs. Ric-wiL sub-assemblies were scientifically designed to allow for pipe expansion and contraction, thus adding to the flexural properties of the system.

The Ric-wiL Copperclad Piping employed in this installation combines pipe, insulation, high temperature asphalt and spiral wrappings of asbestos felt and copper sheeting into thermally efficient units which are corrosion resistant and fully protected against the elements. This Ric-wiL construction is positive assurance of outstanding durability and long life with minimum upkeep and maintenance cost.

FOILCLAD CONSTRUCTION

1. Pipe as specified
2. Insulation
3. Double Coating of High-Temperature Asphalt
4. Asbestos Felt, Tension Wrapped
5. Copper or Aluminum Foil; Tension Wrapped



For complete information on this installation and Ric-wiL Foilclad Piping write: The Ric-wiL Co., Cleveland, O., Dept. 1389

RIC-WIL

INSULATED PIPING SYSTEMS

THE RIC-WIL COMPANY • CLEVELAND, OHIO

REPRESENTATIVES IN PRINCIPAL CITIES

HOW *Weatherproofing** PROTECTS RAILROAD PROPERTIES

*A specialized service of the Western Waterproofing Companies—preserving buildings through an understanding of natural forces and the proper use of correct materials and methods.

CASE HISTORY R 106

TUNNELS

CLIENT: Central of Georgia Railway Co.

PROJECT: 2630' COOSA TUNNEL near Leeds, Alabama

PROBLEM: Originally lined with w... it with brick for 20h... of it was dry, but a... lessly wet. Corro... sitating repeate...

CASE HISTORY R 449

TERMINALS

CLIENT: St. Louis-San Francisco R.R.

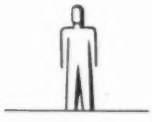
PROJECT: Tulsa Union Depot

PROBLEM: To restore depot to origi...

SOLUTION: After a thoro... and weathe... clean...

TESTED METHODS

. . . to save you thousands of dollars annually by recommending proper methods of restoration.



TRAINED MECHANICS

. . . to skillfully treat your property—backed by 35 years' experience in successful weatherproofing projects.

SUPERIOR MATERIALS

. . . to increase the life of your buildings. Doubly effective, they decorate as well as weatherproof.

Tunnels, terminals, grain elevators, shops, buildings and other railroad properties can be protected and preserved through proper remedial restoration and protective maintenance. Natural physical deterioration—indicated by loose mortar joints, cracking walls and moisture seepage—can be effectively resisted by employing Western Waterproofing's specialized weatherproofing and waterproofing services.

Western Waterproofing's best testimonial is its record of *proven* performance—at a cost which is quickly liquidated in maintenance savings and many extra years of use. *Your* exterior maintenance problem deserves Western's attention—write today for further information on how we can serve *you*.

- **CONCRETE RESTORATION**
- **WEATHERPROOFING**
- **SUB-SURFACE WATERPROOFING**
- **JOINT TREATMENT**
- **SOIL STABILIZATION**

Is All Your Property Weather Resistant?
Contact Western for a Free "Check Up"!

WESTERN WATERPROOFING CO.

Engineers & Contractors

Syndicate Trust Building, St. Louis 1, Mo.

Kansas City, Mo. Springfield, Ill. Charlotte, N. C. Atlanta, Ga.

Other offices in principal cities

More speed, less trouble, with Timken® bearings on the axles

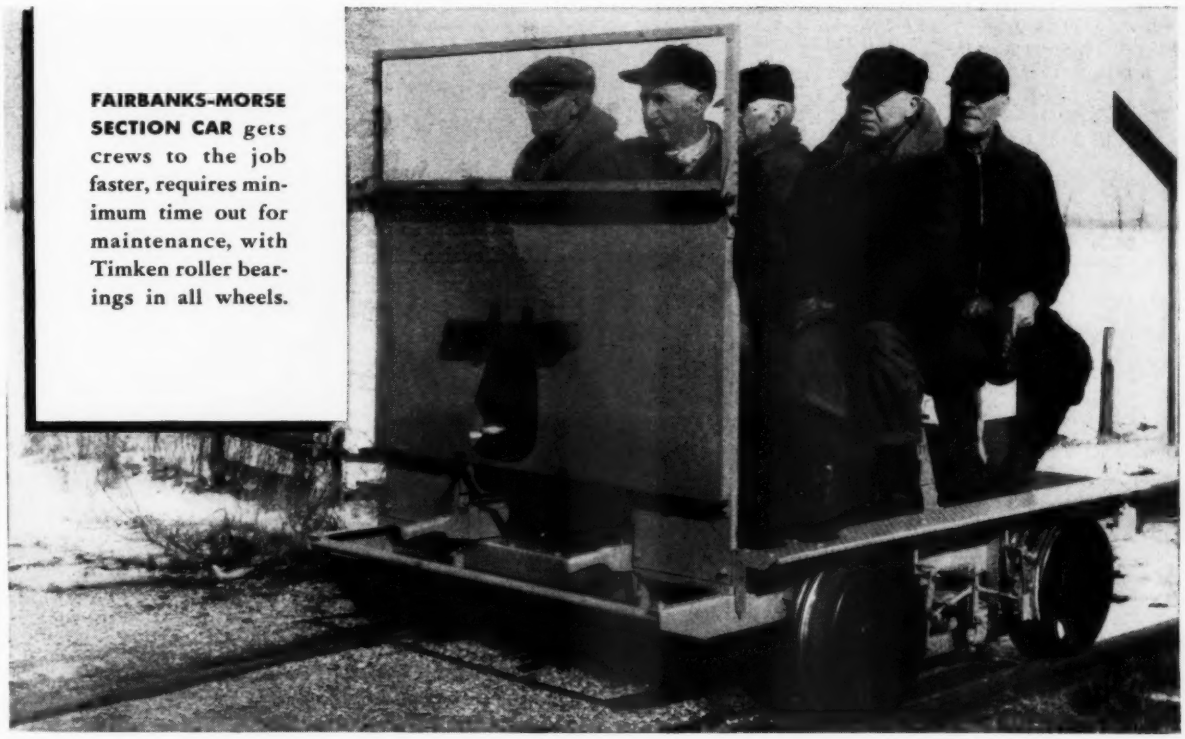
HERE'S the "jeep" of the railroads—a power car that gets section crews quickly to every job. To assure easy starting and fast running with minimum maintenance expense, Fairbanks-Morse equips this car with Timken tapered roller bearings in all wheels.

Precision made and finished to incredible smoothness, Timken bearings make friction a negligible factor. The line contact between the rolls and races gives tremendous load-carrying capacity. Wear is so slight that the bearings normally last as long as the car itself. The design of Timken bearings permits the use of effective closures that keep lubricant in and dirt and water out. Lubrication is reduced to a minimum, resulting in increased availability.

Due to their tapered construction, Timken bearings take both radial and thrust loads. Wheels are kept in perfect alignment. Wheel gauge is maintained at all times.

No other bearing can bring you all the advantages you get with Timken roller bearings. Be sure you have them in the equipment you build or buy. Look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



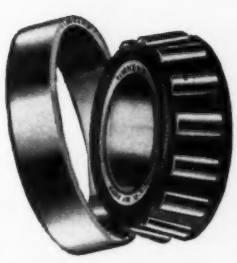
FAIRBANKS-MORSE SECTION CAR gets crews to the job faster, requires minimum time out for maintenance, with Timken roller bearings in all wheels.

TIMKEN BEARING CAPACITY RATINGS INCREASED 25%.

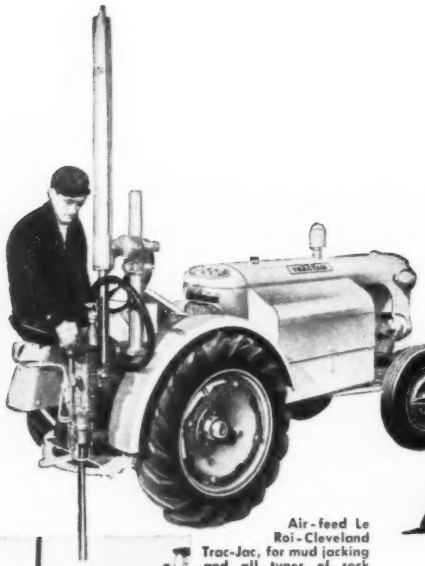
Since Timken bearings were last re-rated some 15 years ago there has been such a further and constant improvement in quality that we are now able to announce a 25% increase in radial and thrust load carrying capacity. This may make possible the use of smaller bearings with savings in bearing cost, material cost and weight. Engineers will be able to utilize the advantages of Timken bearings in more applications than in the past.

A new Timken Engineering Journal, now in preparation, will give you complete capacity rating tabulations. For further assistance, write us today.

TIMKEN
TAPERED
ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION



Air-feed Le Roi-Cleveland Trac-Jac, for mud jacking and all types of rock drilling applications.

Anytime- Day or Nite

. . . handy Le Roi Tractair, equipped with Le Roi-Cleveland Air Tools, saves money for you

Loading—lifting capacity 1000 lbs.

Towing.

Le Roi Tractair can do most anything you ask of it. You can use it as a 35-hp wheel tractor or a 105 cfm air compressor. Interchangeable equipment makes possible such applications as backfilling, loading, sweeping, plowing, lifting. And Le Roi-Cleveland hand-held drills, paving breakers, clay spades, and backfill tampers further increase Tractair's great usefulness.

If you want money-saving utility, here it is in a single package. Contact your nearby Le Roi distributor — he can show you a Tractair at work. Write us for latest literature.

LE ROI COMPANY

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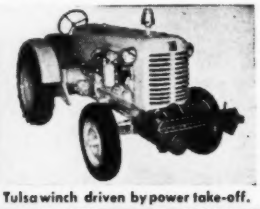
T-9.

Drilling post holes.

Backfilling.

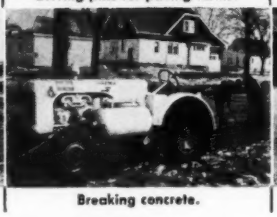
Driving pins for paving forms.



Tulsa winch driven by power take-off.

Plowing snow.

Sawing.



Breaking concrete.

Rotary broom.

Railroad Sales Division

George M. Hogan Company, 327 South La Salle Street, Chicago 4, Illinois

See us at the Track Supply Association Exhibition, Booth 4, 5, 6, & 7, Hotel Stevens, Chicago, Sept. 20-22.

fait accompli!

FROM "Dream" to "Delivery" is sometimes a long, rocky haul. And the road to Nowhere is paved with good ideas that haven't been delivered. So it's news that the American DIESELECTRIC Locomotive Crane is a *fait accompli* . . . a thing accomplished . . . a reality.

Not just one or two, or a dozen, but scores of these revolutionary cranes are today in use on the railroads and in industry, all over the country. Owners are proud to show them in action . . . proud to report specific facts and figures from the acid test of *on-the-job experience.*

It was a great achievement, this blending of diesel power and electric power in a locomotive crane. With diesel power to the deck, electric power to the trucks, the American DIESELECTRIC has upset all previous concepts of what a crane can do. For this is the fact: by its greater work output and its sensationally low maintenance cost, this massive, powerful crane actually *writes off its own cost in five years.*

Would you like to read the story of the DIESELECTRIC? Mail the coupon below, for new descriptive catalog.

THE AMERICAN
DIESELECTRIC
Locomotive
Crane

DIESEL-ELECTRIC LOCOMOTIVE CRANE PATENT NO. 2083460.
TOUCH CONTROL PATENT NO. 2370856.

American Hoist
and DERRICK COMPANY
St. Paul 1, Minnesota

DEPT. B

● Please send me your new catalog describing the American DIESELECTRIC Locomotive Crane.

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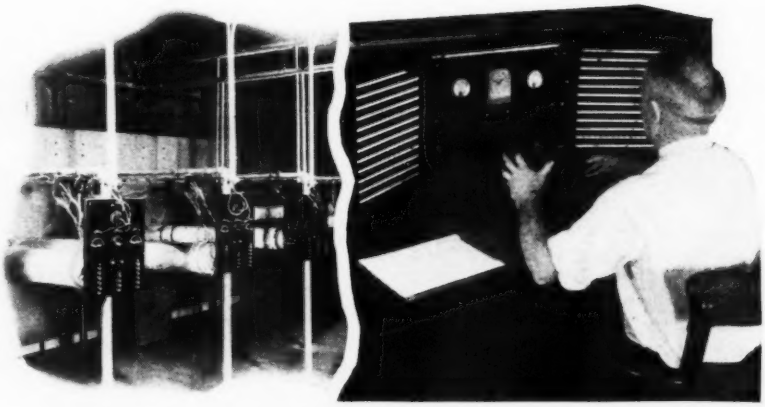
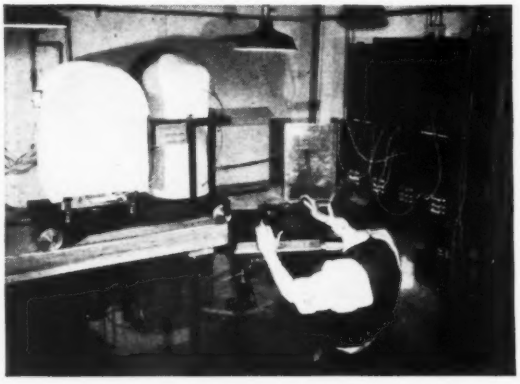
Facts about J-M Insulations Subject: RESEARCH

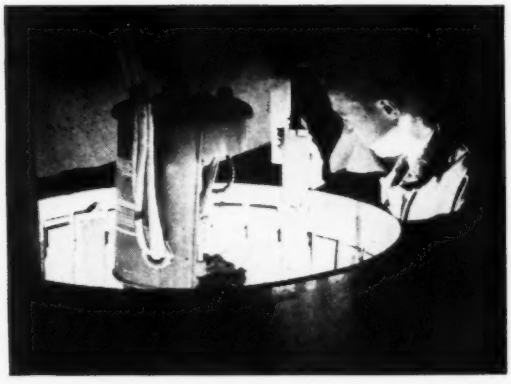
They measure heat to create better insulations



ACCURATE HEAT FLOW MEASUREMENTS are being made by this man to test the thermal conductivity of pipe insulation. He can make readings within ⅓ of 1 degree F. at 800 different points on this apparatus in the Johns-Manville Research Laboratory—the largest, best equipped and most modern thermal testing laboratory in the world.



THIS "HEAT-EYE" UNIT was developed in the Johns-Manville Laboratory to measure the thermal reflectivity of various insulating materials. Heat flow, in all its forms, has been carefully studied by Johns-Manville engineers since the turn of the century.



MAN-MADE WEATHER in this machine tests the ability of insulation jackets and casings to withstand exposure to sunshine, rain and freezing temperatures. The trend toward "outdoor" equipment in many industries makes the findings of this research invaluable.

● The men in the pictures above might well be at work for you . . . testing a new pipe insulation to keep more heat in your steam lines . . . or perfecting a new blanket insulation to help make your air-conditioned coaches the last word in modern passenger car comfort.

For many of the important insulation developments used by the railroads today originated in the Johns-Manville Research Laboratory. Spanning the entire range of temperatures from 400° below zero to 2800° above, these better insulations are returning hundreds of thousands of dollars each year in fuel economies and in more efficient operation of equipment. They are made from not one, but from many basic raw materials each selected to provide the right combination of thermal and physical properties for maximum fuel savings in railroad service.

For complete details and answers to your special insulation problems, write Johns-Manville, Box 290, New York 16, New York.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville *First in* INSULATIONS

..SERVING..BY Saving

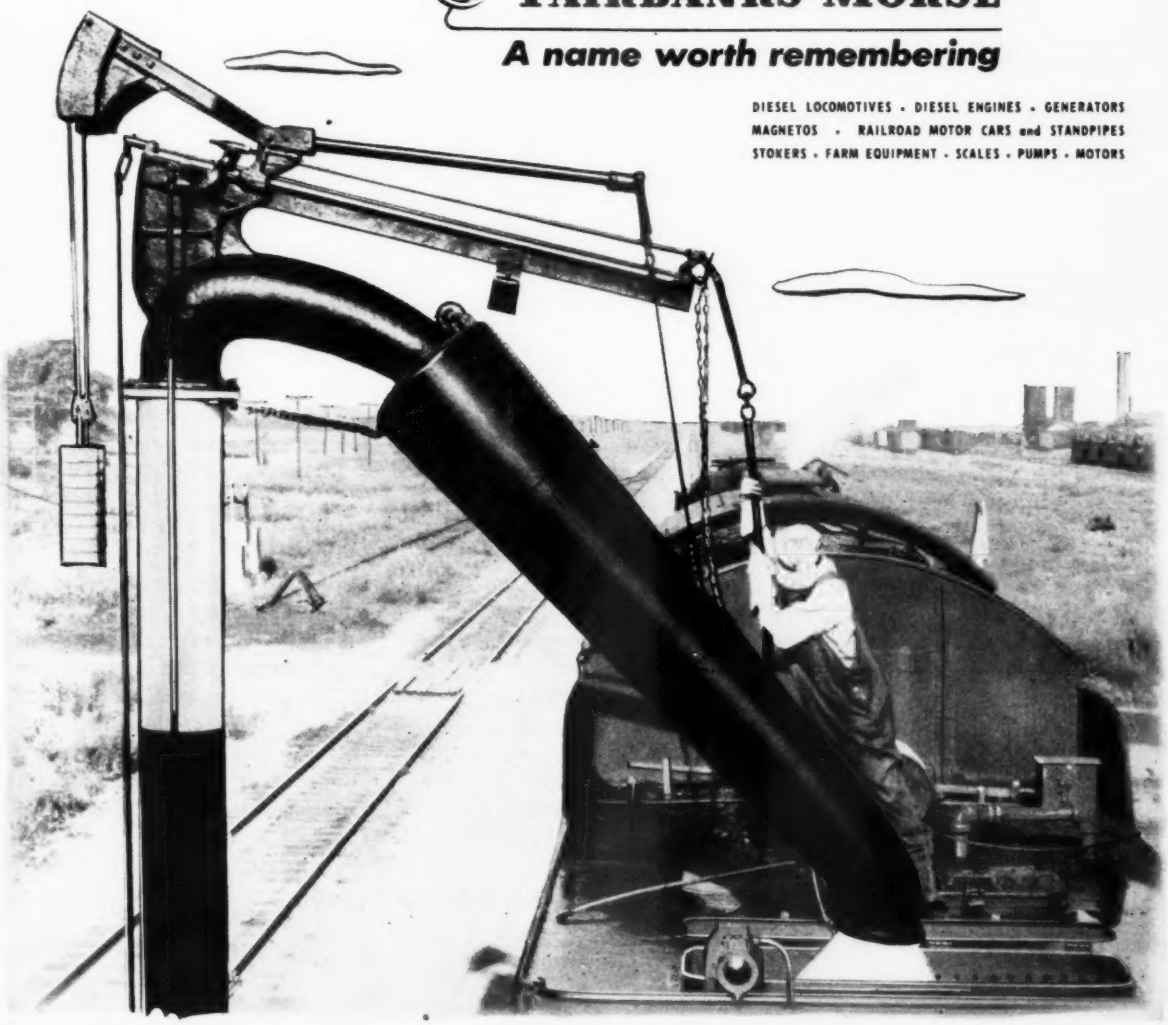
Fairbanks-Morse, today as in the past, is serving the railroads of the nation with a long line of railroad equipment designed and built by men who have "grown up with the roads"—equipment that saves time, manpower and maintenance dollars wherever it is used.

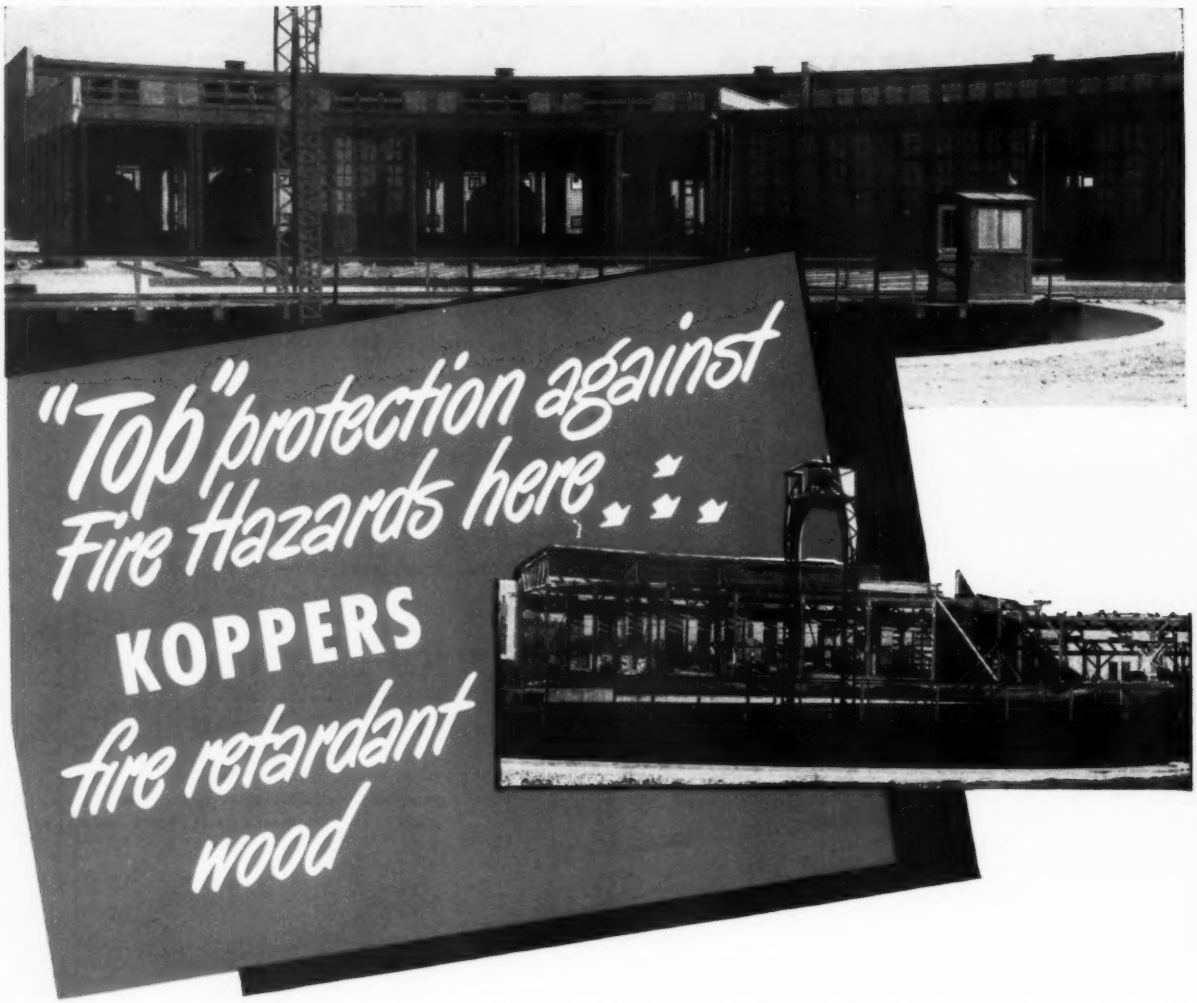
That's why Fairbanks-Morse is a primary source for oil and water standpipes, coal and sanding stations for diesel and steam locomotives, cinder conveyors, railroad scales, pumps, motor cars—and other primary equipment. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • GENERATORS
MAGNETOS • RAILROAD MOTOR CARS and STANDPIPES
STOKERS • FARM EQUIPMENT • SCALES • PUMPS • MOTORS





This engine house is part of a new terminal built by the Baltimore and Ohio Railroad at East St. Louis. Everything is completely modern and up-to-date . . . built for economy, efficiency and permanence. So what material was used for the roof trusses, purlins and roofing? *Koppers Fire-retardant wood, of course.*

Engineers are making extensive use of Koppers Fire-retardant wood, not only in engine houses where fire hazard is always present, but as an *extra measure of protection* in other structures as well. Effectiveness in retarding both the spread of flame and the generation of smoke and fumes has been dramatically confirmed in a number of fires in buildings where the material was used.

In one typical instance, a lacquer fire that warped and melted metal lighting fixtures was easily extinguished and produced only a shallow char in the wood, *insufficient to require any replacement.* Observers have agreed that the fire-retardant wood was responsible for preventing a disastrous fire, with possible complete loss of the building.

Koppers conveniently located plants are equipped to treat your lumber and timbers with CZC (FR) for fire retardance (this treatment also confers high resistance to decay and termites) or with any other recognized preservative. If desired, members can be preframed to blueprint, and delivered to you all ready for assembly on the job. Get full details—ask for new bulletin, just off the press, "Koppers Fire-Retardant Wood."

KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PENNSYLVANIA

For additional information, use postcard, pages 957-958

Hauling a hill away

When a hillside persists in eroding itself into trackside drainage ditches, the best thing to do is to haul the hill away.

This hill near Flora, Miss., had one of those erosion-ridden slopes that kept getting out of control. The railroad put two International TD-18 Diesel Crawlers to work—one with a scraper, the other with an angle-blade 'dozer. The tractors teamed up, cut down the slope to minimize erosion and hauled the excess dirt away—a round trip of one-third of a mile. A dragline, powered by an International engine, finished cleaning the ditch. Now the hillside stays put.

Whether the job is moving a hill or handling heavy loads in the shops or yards, the economical answer to the problem is International Power or equipment powered by International engines.

Let your International Industrial Power Distributor show you how it will pay you to standardize on International Industrial Power. You'll find International Power can do hundreds of jobs better, faster and at lower cost. That means greater economy and efficiency on your projects.

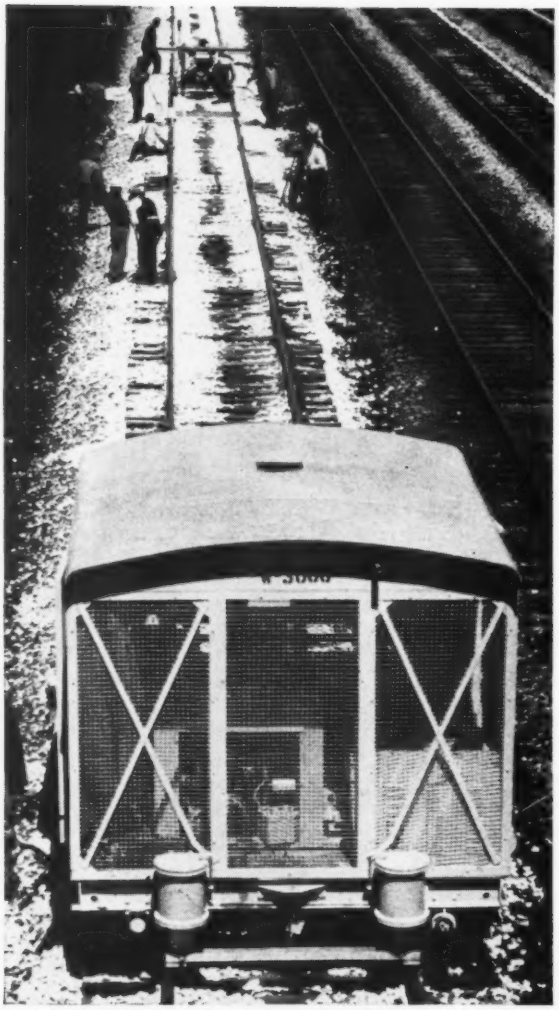
Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
Chicago 1, Illinois

Tune in James Melton on "Harvest of Stars" CBS Wednesday evenings

Standardize on Power that Pays

INTERNATIONAL
INDUSTRIAL POWER

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS



POWER TRACK BALLASTER

Ballasting machine performing tamping operation on a section of New York Central track.

Power Ballaster *mechanizes*

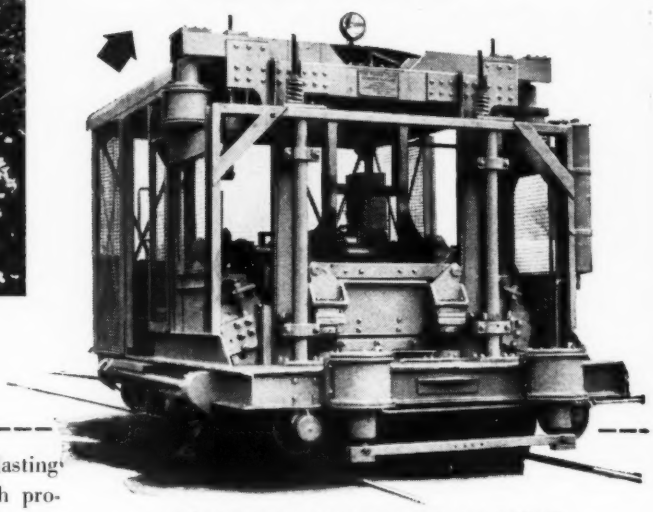
CRIBBING AND TAMPING

SEE DEMONSTRATION AT

THE TRACK SUPPLY ASSOCIATION EXHIBIT

Hotel Stevens—Chicago Booths 160-164

September 20-21-22, 1948



POWER TRACK CRIBBING MACHINE

Loosens and removes old, compacted ballast from between the ties, preliminary to resurfacing the track.

Write for complete information, including comparative operating performance under a wide range of track, ballast and traffic condition.

THESE revolutionary machines now speed ballasting and drainage correction operations on such progressive railroads as New York Central, Pennsylvania, Erie, Northern Pacific, and Great Northern. They not only save up to 50% in cost per mile of track but turn out a more uniform job faster . . . getting the work done under the present manpower conditions.

The Power Track Cribbing Machine does the work of a large cribbing gang with an efficiency impossible with hand tools. The Power Track Ballaster forces ballast uniformly under each tie and tamps it with uniform firmness. Each can be set off track by its own power in less than 5 minutes.

POWER BALLASTER DIVISION

Pullman-Standard CAR MANUFACTURING CO.

© 1948, P.S.C.M.CO.

79 East Adams Street, Chicago, Illinois

Every Railroad's Greatest Asset
PUBLIC SAFETY

Here a few detected rail failures containing Transverse Defects have been broken for analysis. Seventy-two (72%) of the Transverse Defects found in 1947 were small in size—a good indication of Sperry efficiency.

GUARDED FOR MORE THAN 100 RAILROADS BY SPERRY'S FLEET OF 20 DETECTOR CARS

During 1947, Sperry Detector Cars found approximately 47,000 rails containing Transverse Defects —equivalent to 28.5 TD's per 100 track miles tested and an increase of almost three TD's per 100 miles over the 1946 figures.

Also during 1947, approximately 36,000 Longitudinal Defects (Vertical and Horizontal Split Heads) were found, making 1947 the sixth consecutive year in which more than 35,000 Longitudinal Defects have been detected.

The annual results again confirm the superiority of *Sperry-operated* Detector Cars which find:

1) MORE TRANSVERSE DEFECTS — and of smaller size — than any other method of testing rails in track, and
2) MORE LONGITUDINAL DEFECTS — than any other method of testing rails in track.

Higher train speeds and greater axle loads have increased the need for effective rail testing. Today as always, Sperry stands ready to make comparative demonstration tests to prove superior performance.

SP-124

SPERRY RAIL SERVICE

DIVISION OF SPERRY PRODUCTS, INC.
Chicago, Ill., Danbury, Conn., St. Louis, Mo.

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

These washers are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

We control every step of their manufacture—from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

BEALL TOOL DIVISION *of Hubbard & Co.*
EAST ALTON, ILL.

Specialist Manufacturers of Spring Washers

BEALL Hi-Duty
SPRING WASHERS
MADE ESPECIALLY FOR RAILROAD SERVICE

Barber-Greene

Mechanize Now!

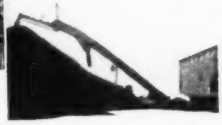
WITH THE ONE-MAN MACHINE THAT DOES *all 3...*

847167

1 Car unloading

445448

2 Stockpiling



A-693-B

3 Loading — screening

846434

Save

MANPOWER, INVESTMENT, DEPRECIATION WITH THE B-G 661

The B-G 661 Gooseneck makes it possible to mechanize all coal unloading, stockpiling and loading operations—to speed up and effectively cut the cost of all three. This self-propelled machine combines Truck Loader with power driven Car Unloader and Stacker to enable one man to handle all basic coal-moving work around the yard or plant. To learn more about the savings a 661 Gooseneck can mean to you fill in and send for new literature. Address Barber-Greene Co., Aurora, Ill.

With a 661 Gooseneck and Unloader-Stacker attachments, you can:

- *Unload all sizes of coal from car in 90 minutes*
- *Load trucks at 1½ tons per minute*
- *Screen coal with vibrating screen*
- *Stockpile to elevation of 20 ft.*
- *Load largest trucks, regardless of sideboards*
- *Move equipment under its own power*

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The new True Temper Rail Anchor represents in improved form the evolution of the widely and favorably known Stead Anchor.

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Doing the unusual is *usual* with a GRADALL

Placing a heavy electric motor was easy for this Gradall.

Cleaning up the right-of-way.

Close quarters operations.

Ditching and loading with a Gradall.

● Railroad maintenance men have long recognized the great advantages that would come were they to have a single machine which can do a multitude of jobs besides the simple, ordinary earth moving projects. The Warner & Swasey Gradall was designed to fit this need.

The new Gradall with its "Arm-Action" boom is highly maneuverable, moving with the speed of a truck over difficult terrain to any location. It is unhampered by steep grades, sharp curves, or low bridge clearances.

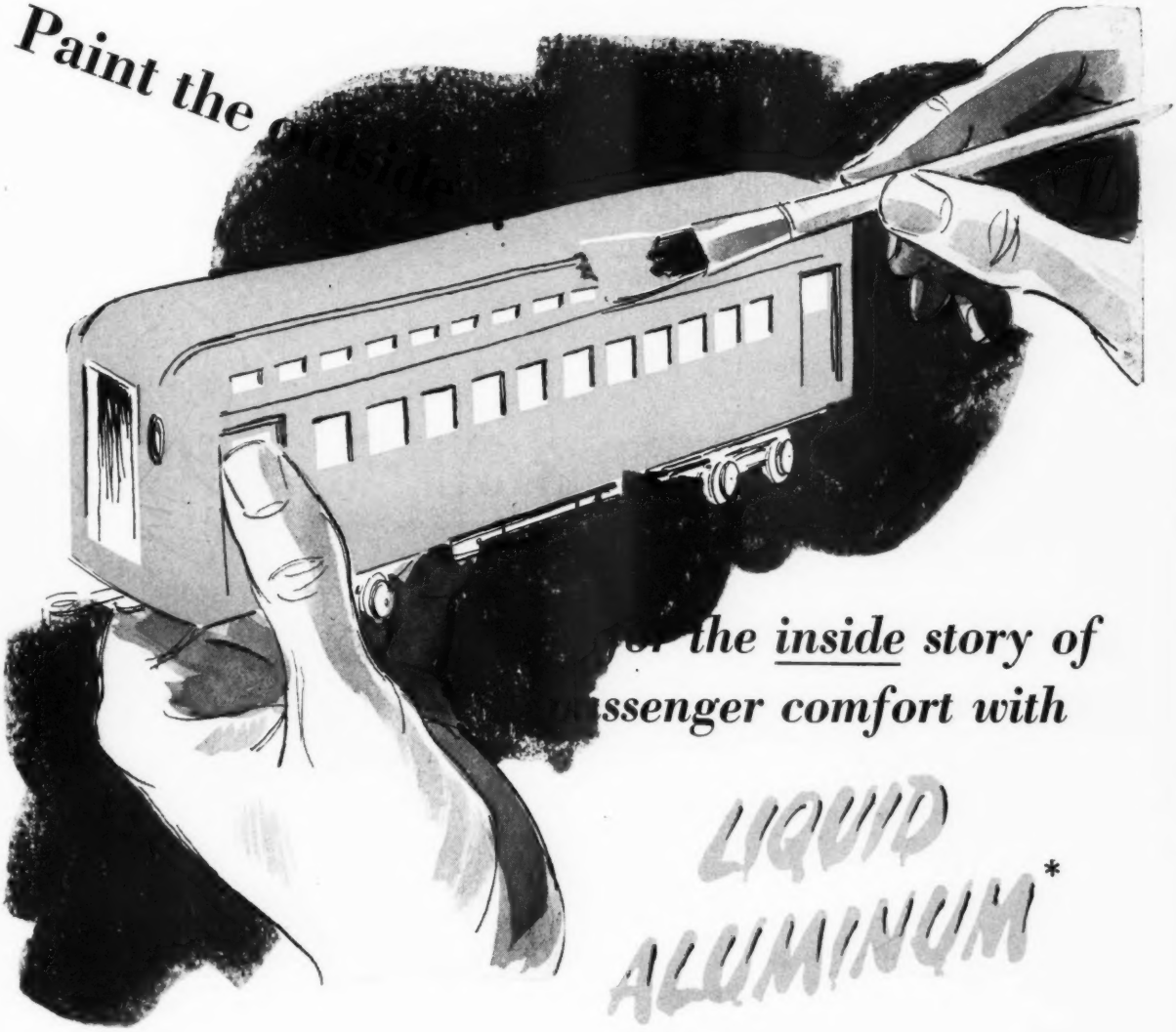
In railway maintenance, the Gradall with its many interchangeable tools at boom end, can clean a ditch, clear tracks between rails and around ties, cut a trench, grade a slope—*drive a spike,* if need be. This precision minimizes hand clean-up labor, makes the Gradall versatile and invaluable in handling the many different jobs encountered in railroad maintenance operations.

Get all the facts about Gradall. Write Warner & Swasey, Cleveland 3, Ohio.

GRADALL DIVISION
WARNER & SWASEY
Cleveland

Gradall Reg. U. S. Pat. Off.

Paint the outside...



...the inside story of ...ssenger comfort with

LIQUID ALUMINUM*

MAKE *this simple test:* Take two of your regular passenger coaches and paint *one* with *Liquid Aluminum*. Let *both* stand in the sun for a few hours with the doors and windows shut. Then walk through the two cars. The lower temperature in the painted car will amaze you!

The great insulating ability of *Liquid Aluminum* comes from the high purity and polish of its pigment particles. They reflect as much as 75% of the sun's heat rays. Think how this can save power in air conditioned coaches... and what it can mean on freight cars in the transportation of perishables.

But *Liquid Aluminum* has other advantages, too. There's economy in its excellent hiding power... its long-lasting protection against abrasive cinders and attacks of weather... its ability to withstand sudden temperature changes. And it will give your rolling stock new beauty at remarkably low cost.

Talk to your regular paint supplier about the many advantages of *Liquid Aluminum*. Or write—

Reynolds Metals Company,
Pigment Division,
19 East 47th Street, New York 17, N. Y.

* ***Liquid Aluminum* is aluminum paint made with Reynolds Aluminum Pigment—the very foundation of quality. Whether you buy by brand or specification, it will pay you to make sure you are getting *Liquid Aluminum* for maximum reflectivity, hiding power and durability.**

REYNOLDS METALS

IT'S MORE THAN PAINT... IT'S

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LIQUID ALUMINUM

Reynolds Pioneering Made Aluminum Competitive—take advantage of it!

IF YOUR SYMBOL IS MISSING

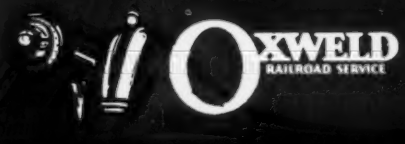
YOU ARE MISSING SOMETHING

Here are the symbols of twenty-six railroads that have installed oxy-acetylene pressure-welded rail. Jointless continuous rails in the trackage of these railroads range in length from 100 ft. to 12,780 ft. In twenty-five states throughout the country, this long rail is in high speed open track, on bridges, in tunnels and streets, and in other special locations. This oxy-acetylene pressure-welded rail has no joints—needs no joint maintenance.

Continuous rail has been produced and installed under OXWELD procedures since 1938 and is no longer considered experimental. Some of the nation's fastest trains, as well as the heaviest freight equipment, now glide smoothly over oxy-acetylene pressure-welded rail.

This is another OXWELD service developed as a result of working with American railroads for more than a third of a century. Write for the booklet "How Long Can A Rail Be."

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto



SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

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N&W RAILWAY
Santa Fe
Burlington Route
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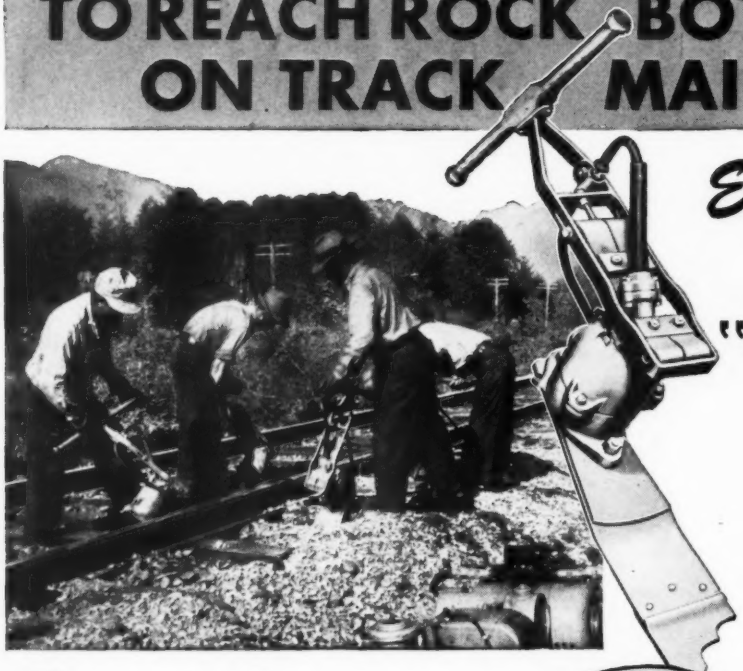
JERSEY CENTRAL LINES
THE ALTON RAILROAD
CHICAGO
ST. LOUIS
The ONLY WAY
KANSAS CITY
PRESSURE-WELDED RAIL

TO REACH ROCK BOTTOM COSTS ON TRACK MAINTENANCE



Equip Your SECTION GANGS *with* JACKSON "LO" TIE TAMPERS

For spot tamping, skeletonizing and such regular out-of-face or surfacing work as section gangs do on many roads, no other equipment equals the productivity and quality of work obtained with Jackson "LO" tampers and power plants. On this type of operation they will bring your costs down to the very minimum!

Use the JACKSON MULTIPLE M-T TAMPER *for* MAJOR BALLASTING OPERATIONS

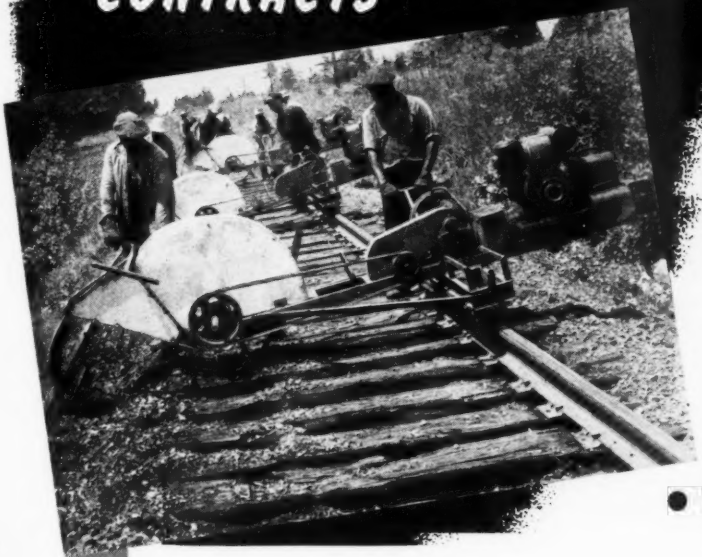
This machine is revolutionizing track ballasting methods from the standpoint of low costs, permanence and absolute uniformity of track. No follow-up or smoothing is necessary, and "the track stays put!" Equally efficient in rock ballast, gravel and light ballast. ONE man operates 12 tampers simultaneously. When working in tandem, two Jackson M-Ts will usually double the daily footage of surfacing gangs without materially increasing the number of men ahead of the machines; and there are just 2 tamper operators instead of 24!

EXHIBITOR — BRIDGE & BUILDING TRACK SUPPLY — HOTEL STEVENS, CHICAGO SEPT. 20-21-22, 1948 — associations

IT'S A "WORLD-BEATER" COMBINATION

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan

PUT NATIONALLY-KNOWN *Experts* TO WORK ON YOUR *Trackwork* CONTRACTS



- RELAYING
- REHABILITATION
- ABANDONMENTS
- TRACK STRIPPING
- BALLAST CLEANING
- TRACK CONSTRUCTION

On original projects or subcontracts . . . a few feet or a hundred miles, where there is railroad trackwork to be done, it is a job for Royce Kershaw, Inc.

Twenty-five years of specialized experience on contract trackwork throughout the United States and Central America provides a solid background of skill and financial responsibility to handle contracts of any size and to produce top quality completed work—on schedule.

Use of Kershaw Trackwork Equipment and modern engineering and time study methods cut overall costs to such an extent that a number of major railroads find trackwork by Kershaw more economical than using their own crews!

If you have trackwork coming up this year . . . or next . . . get complete information from Kershaw now.

ROYCE KERSHAW CO., INC.

RAILROAD CONTRACTORS

P. O. BOX 510 **MONTGOMERY, ALABAMA**

Twenty-five years of "working on the railroads"
From 900 foot spurs to 80 miles of main line.

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Check these features
of CP-5 Gasoline Tie Tamper
at Booth 41

- Starting is quick and easy – by pressure on one of the grip handles.
- Balance is perfect – weight is centered between grip handles.
- View of work is unobstructed, because of compact engine design and slender contour of lower end of tool.
- Vibration is minimized in grip handles by air-cushioning of return stroke of free-throw striking piston – machine life is prolonged.
- Magneto provides efficient ignition system under all conditions – there are no batteries, thus eliminating costly battery replacements.
- Standard two-cycle engine operates on gasoline-oil fuel mixture – oil in fuel provides automatic lubrication.

Write for Bulletin 1943
Maintenance-of-Way Equipment

OTHER CP MAINTENANCE-OF-WAY AND TRACK EQUIPMENT

Air Compressors – Patrol, Crawler, Flanged Wheel Mounted . . . Pneumatic Tie Tampers . . . Reversible Pneumatic Impact Wrenches . . . Wire Brush Machines . . . Boyer Rivet Busters . . . Scalers . . . Spike Drivers . . . Nut Runners . . . Concrete Vibrators . . . Winches . . . Rotary Drills . . . Wood Borers . . . and other pneumatic and electric tools.

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HOTEL STEVENS, CHICAGO
SEPT. 20-21-22, 1948

CHICAGO PNEUMATIC TOOL COMPANY
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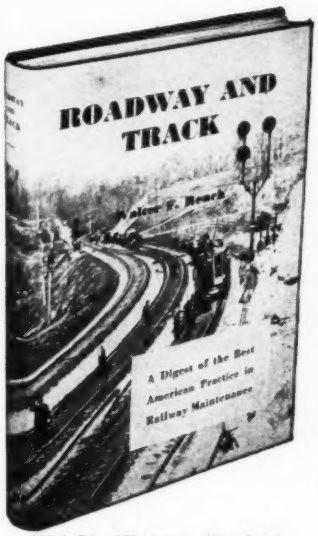
With Supplement Bringing Information Up to July, 1948

ROADWAY AND TRACK

By Walter F. Rench

Formerly Supervisor on the Pennsylvania Railroad;
Author of *Simplified Curve and Switch Work*



Third Ed. 350 pages, 101 photographs, 19 line drawings, 12 tables, index, 6 x 9, cloth, $5.00.

The third edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the *Pennsylvania,* A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

Part III—SPECIAL PROBLEMS AND DUTIES: Maintenance Problems and Methods Used—Economics of Track Labor—Special Duties in the Maintenance of Way Department.

SUPPLEMENT: A 10-page Supplement describing new A.R.E.A. recommendations and changes up to July 1, 1948, can be cut for insertion in proper place.

Send For Your Copy Today

Send in your order today. If it is not the track book you have been looking for you can mail it back.

For Track Supervisors

While written primarily to serve the needs of track supervisors and other maintenance officers, the new edition contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work and of methods used elsewhere, will find the book helpful.

—Ten Days Free Examination Coupon—

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30 Church Street, New York 7, N. Y.

Please send me on Ten Days Free Examination a copy of the Third Edition of ROADWAY AND TRACK by Walter F. Rench. If satisfactory, I will remit the list price of $5.00. Otherwise, I will mail the book back postpaid, without obligation.

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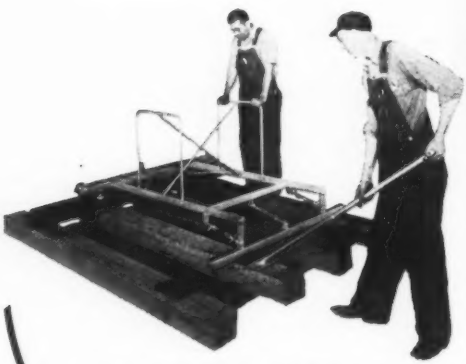
R. E. & M. 9-48

Cut your Maintenance costs!

Woolery Combination Chemical Sprayer and Weed Burner. One machine now serves a dual purpose. Showing machine spraying an 18′ wide swath.

Woolery Combination Chemical Sprayer and Weed Burner showing machine used as a weed burner. Burns a swath 15′ wide.



Woolery Tie Plate Spacer speeds up rail laying by quickly locating tie plates at the proper distance from other rail.

WRITE FOR FREE BULLETINS

Woolery Tie Cutter with Undercarriage permits two cuts on one tie without lifting machine and turning it around. Speeds tie cutting operation.

...use WOOLERY equipment

Operating modern trains on fast schedules requires modern track maintenance. And for modern track maintenance at low cost over 75 railroads now use all types of Woolery Maintenance Equipment.

The result of 23 years of experience, Woolery Equipment is designed and built to do the job faster, better, and safer. All costly time consuming methods for keeping track and roadway maintained are eliminated. With Woolery Equipment you can stretch your maintenance budget by saving time and increasing efficiency.

Woolery Weed Burners, Creosote Sprayers and Tie Cutters are well known for their outstanding performance. Now, by popular demand, Woolery is introducing these new items to its famous line.

1. **Woolery Flangeway Cleaner**
2. **Woolery Joint Oiler**
3. **Woolery Combination Chemical Sprayer and Weed Burner**

Be sure to stop at the Woolery Booths and discuss these new units with our men. If you cannot get to the show, write for new bulletins today.

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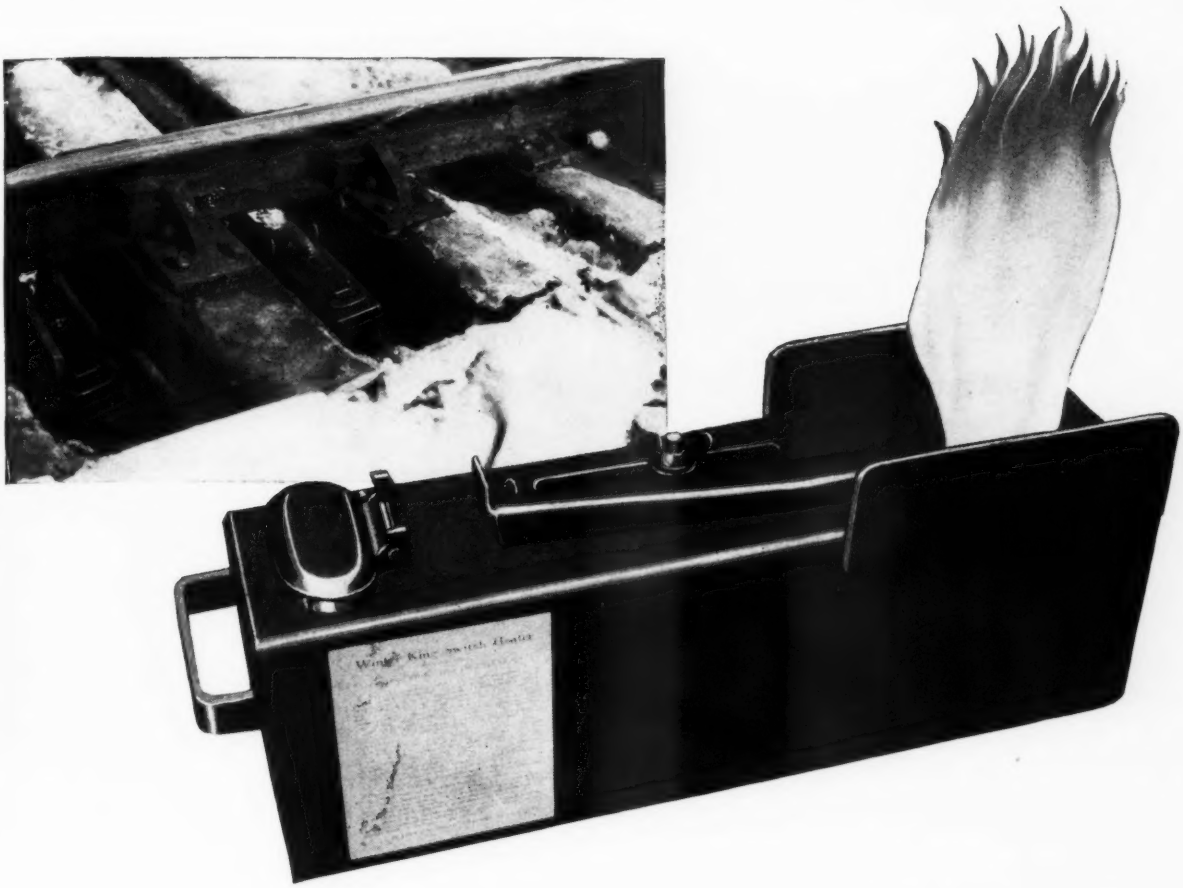
EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., PITTSBURGH, PENNA.



How to Keep a Switch from Freezing Up

We don't like to rush the season . . . but now's the time to be laying in your Winter King Switch Heaters. It's good to have 'em a little ahead of the actual winter snows; then you're *sure*.

These sturdy little Bethlehem heaters really do a job. As the picture shows, they are easily slipped between ties, with the flame end under the rail and switch point. Even in gusty wind, the shielded flame keeps burning, furnishing constant heat. Winter Kings fight snow as it falls. They help eliminate freeze-ups far more effectively than hand methods ever could.

They're economical, too — both in first cost and operation. Using kerosene, each unit holds enough oil for from 9 to 15 hours of burning in storms of average intensity. The size of the flame is regulated by an adjustable cover that slides over the combustion chamber.

With 16½-ft switches, four Winter Kings to a side are usually recommended. One man can take care of a large group and still have time for other duties. Ask for complete details if you aren't already familiar with these heaters. They're an investment in safety.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

Winter King SWITCH HEATERS

BETHLEHEM STEEL

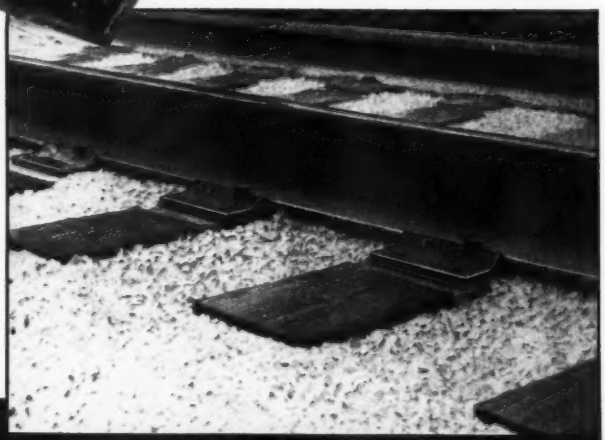
FABCO TIE PADS

for
OPEN TRACK

LONGER TIE LIFE
Because . . . .
FABCO TIE PADS
- Prevent Mechanical Wear of Ties
- Resilient — no set — no loose spikes
- No renewals required

FABCO TIE PADS for Open Track reduce the mechanical wear of ties and are available at prices which definitely help reduce the final cost of ties. Stocked in ¼" thickness, in standard tie plate sizes: 7¾" x 12", 7¾" x 13", 7¾" x 14". Other sizes on special order. Withstands extremes of temperature, moisture, brine, mildew, sand . . . and spikes do not have to be driven down a second and third time.

Made by the Makers of Fabreeka



FABREEKA PRODUCTS COMPANY, INCORPORATED
222 M SUMMER STREET BOSTON 10, MASS.

Why drill a pipe full of holes?

It does seem odd to drill holes in a pipe intended to carry water. But this is one sure way to cut roadbed maintenance expense, and provide greater safety the year around.

Even the best of roadbeds cannot hold up on a soft, soggy foundation. Budgets take a beating—safety takes a nose dive. The permanent cure is to install ARMCO Perforated Pipe. It picks up harmful groundwater and drains it away safely.

Installing ARMCO Pipe is easy and economical. The work moves fast with unskilled labor. Long, easily-handled lengths are quickly joined by sturdy band couplers. Shifting soils and severe frost action are no hazards. Your subdrainage system has *proved strength* to resist crushing, cracking or disjointing under the impact and weight of heavy loads. Continued efficiency is assured.

You'll like ARMCO Perforated Pipe for complete railroad drainage systems or for taking care of trouble spots wherever they occur. Write for complete information. Armco Drainage & Metal Products, Inc., 1845 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

ARMCO PERFORATED PIPE

Is your plant an easy target for corrosion?

KOPPERS COATINGS can protect it!

EVERY year, rust and corrosion exact a terrific toll from industry . . . billions of dollars in fact. But you can easily cut your plant's contribution—and it *is* a contribution—by using Koppers Industrial Protective Coatings.

For example, here's how Koppers Bituplastic* protects metal, concrete or masonry: Bituplastic (it's not a paint) coats exposed surfaces with a tough film. This protective film is thick; three coatings of Bituplastic build up a seamless, non-porous sheath nearly 1/16" in thickness—a sheath that not only resists water, but the assaults of sun, salt air, condensation, atmosphere, weather, and acid or alkaline fumes.

Read the list of other advantages offered by Bituplastic. And for complete data, including suggestions for use and rate of coverage, send for our new Bulletin on Bituplastic.

8 Other Advantages of Bituplastic...

1. *It is a highly-refined, easily-workable coal-tar pitch coating.*
2. *It covers heavily; 1/64" to a coat, or about 5 times the thickness of ordinary paint.*
3. *It does not "alligator" or check.*
4. *It is applied cold with brush or spray.*
5. *It is fire retardant.*
6. *It does not crack at minus 50°F. or sag at 500°F.*
7. *It is practically odorless and tasteless.*
8. *It dries quickly.*

*Trade-Mark Reg. U. S. Pat. Off.

KOPPERS

KOPPERS COMPANY, INC., Dept. 808T, Pittsburgh 19, Pa.

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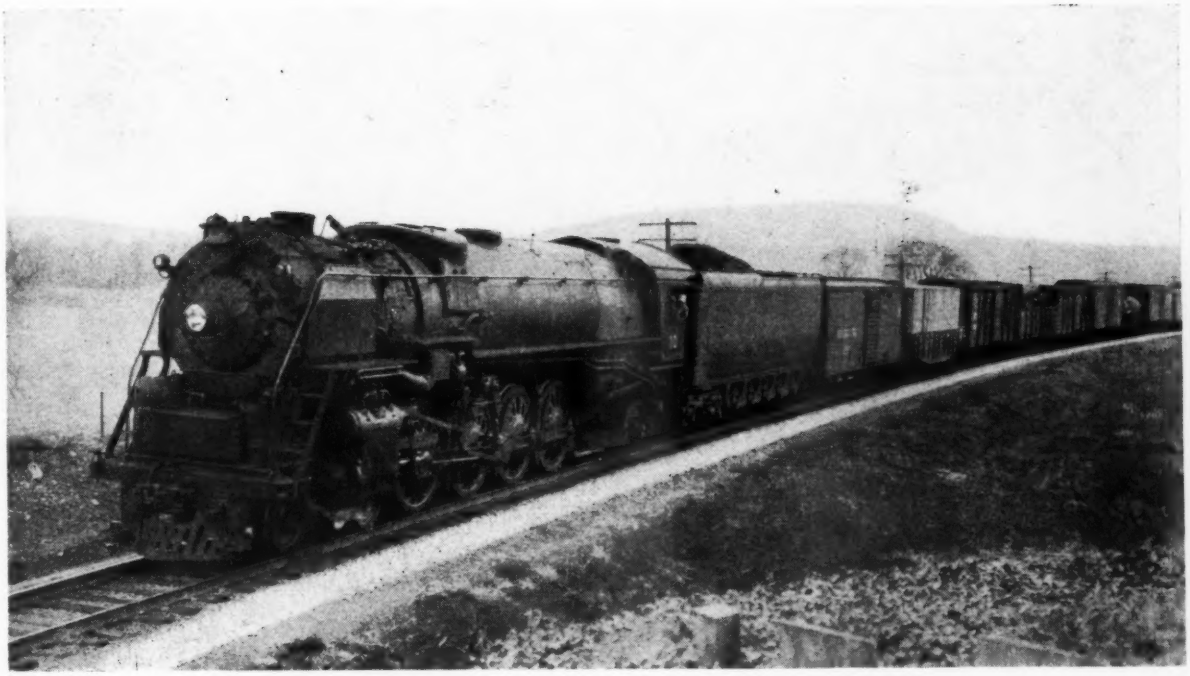

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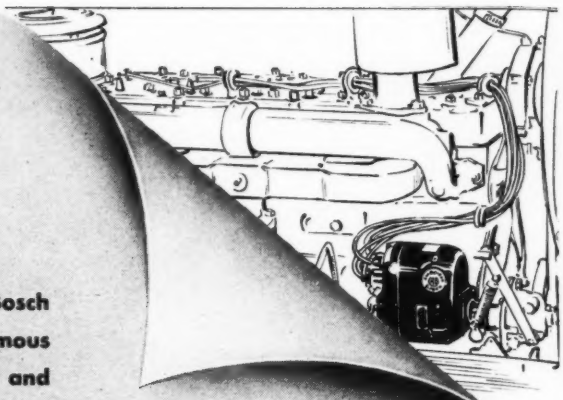

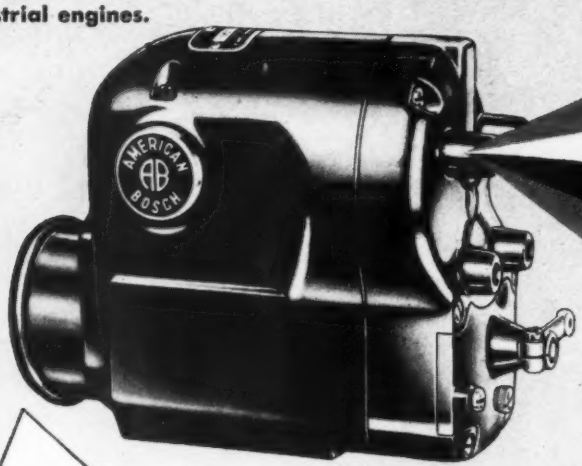

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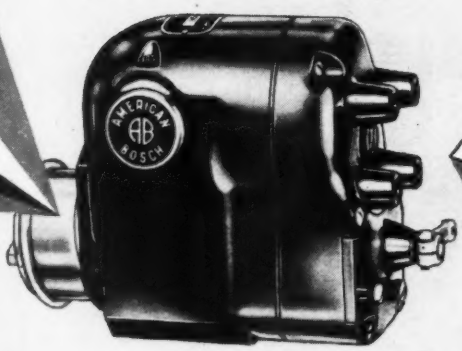

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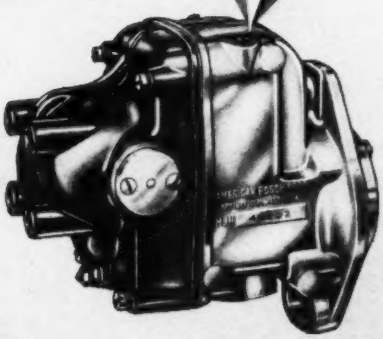

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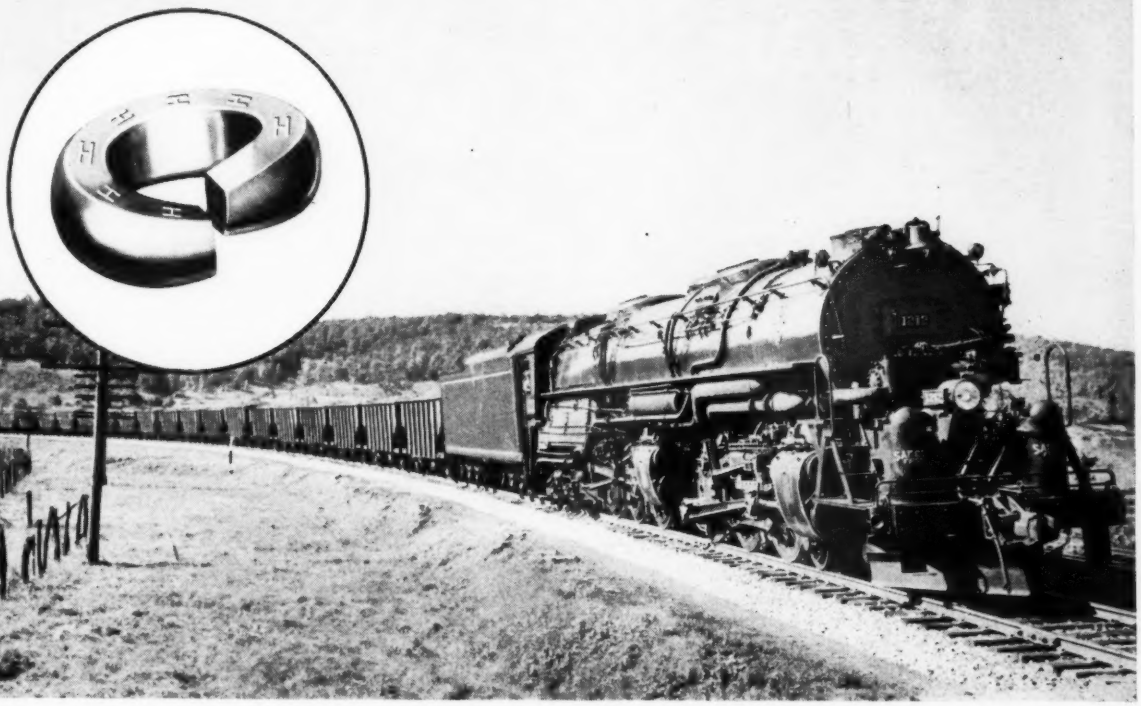

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No. 237 of a Series

Railway
Engineering and Maintenance
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Subject: Expanded Readership

September 1, 1948

Dear Readers:

One of the many satisfactions that comes to an editor of a publication like Railway Engineering and Maintenance—and there are many satisfactions—is the knowledge that what he publishes has a wide readership and is helpful to so many. We of the staff of Maintenance have that satisfaction.

We have that satisfaction first through our large circulation in a relatively restricted, yet highly specialized, field; we have it through the knowledge that Maintenance is received, through paid subscriptions, by practically all of the higher officers in the engineering and maintenance-of-way departments of the railroads of the United States and Canada; we have it through the knowledge that Maintenance has an unusually high regular "pass-along" readership, which may triple or quadruple the number on its subscription list; and we have it through your many letters of comment, inquiry and commendation.

We have that satisfaction of serving many also in another important way, and that is through the thousands of reprints of specific articles that are run off nearly every month to meet requests from railroads or supply companies. Usually no record is kept of where these reprints go, although we know they have a highly select distribution among those most interested in the subjects covered. But for one instance recently, specific figures are available and may prove of interest to you.

This involves the article on Insulated Rail Joints, by E. F. Schermerhorn, manager, Insulated Joint department, The Rail Joint Company, which appeared in the December, 1947, issue of Railway Engineering and Maintenance, and which, on our suggestion, was presented also in the January, 1948, issue of our sister publication—Railway Signaling.

As soon as these issues reached the desks of readers, requests for reprints started coming in, and to date the distribution of reprints, entirely on requests, has reached approximately 10,0000 copies. Up to July 28 more than 9,100 copies had been distributed in lots of five or more. A record kept by the author of those requesting reprints lists the names of 90 engineering and signal officers on 59 different roads, with the number of copies requested by individual roads ranging from five to as many as 1,158. The average number of copies requested per road was 154. Of the total number requested as of July 28, 4,519 were for distribution among engineering and maintenance officers and 4,584 were for signal officers.

Writing to the editor on the gratifying demand for reprints, the author said, "I think it is significant as showing the real desire of these men for information and knowledge—and also showing the value to them of your publications."

Such evidence of reader interest is, indeed, satisfying and a stimulus to us always to search out and present the most interesting and helpful material in every issue.

Sincerely,

Neal D. Howard
Editor

NDH:ag

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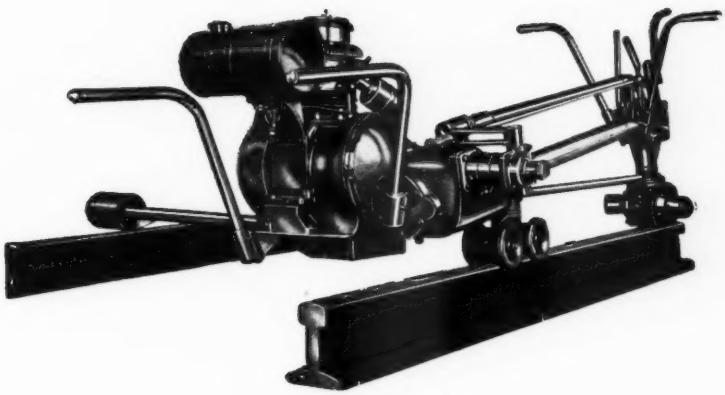

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Railway Engineering and Maintenance

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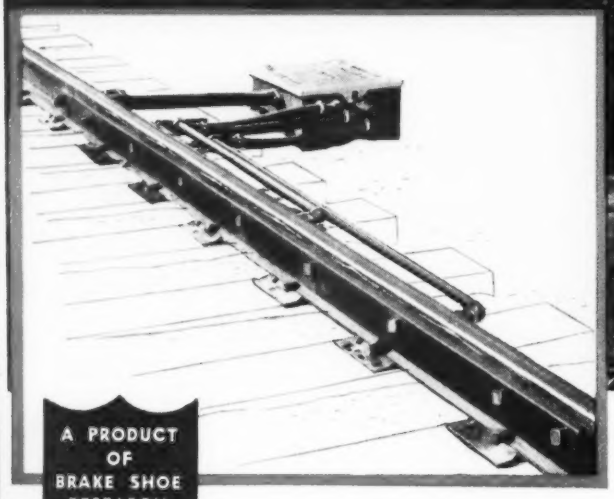

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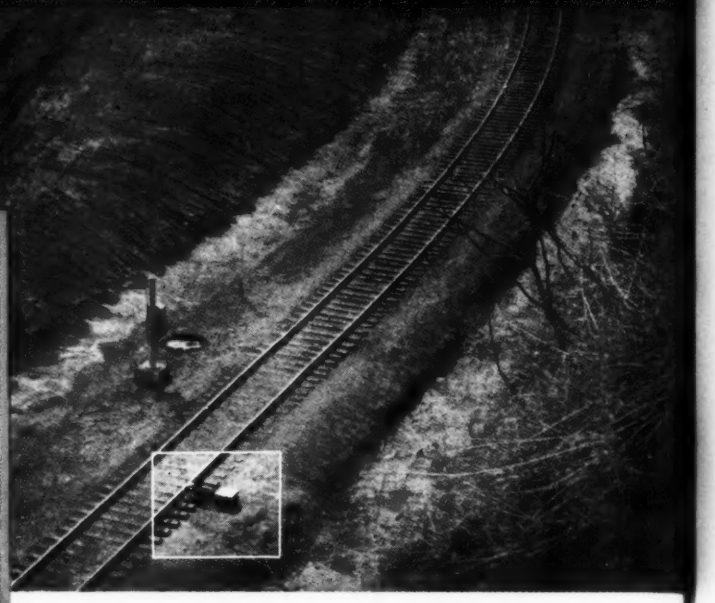

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Railway Engineering and Maintenance

The Next 100 Years—

Offer Even Greater Opportunities in Railroading

The railways are currently displaying in the Railroad Fair on Chicago's lakefront their growth and achievements over the last 100 years. It is a notable spectacle that has already been viewed with enthusiasm and acclaim by more than 2,000,000 people, and, no doubt, will be visited by another million before it closes its gates at the end of September. It delights, it entertains, it is educational in its historical aspects, and it reflects great credit on the railroad industry. But if it does *only* these things it will have been a failure from the standpoint of the railways. In addition, it must imbue the public with the importance of the railroads to the nation and themselves, in the future, and it must inspire within railroad men, to the last employee, determination that future achievements in their industry shall be no less noteworthy than those in the past.

Stimulated by the Fair, every railroad man should ask himself—What's ahead in the *next* 100 years? This is not an academic question. A future of continued, long-range progress for the railways is imperative to the growth, development and defense of the country. It is vitally important to those many thousands who have invested billions of their savings in the industry. Likewise, it is important to every present railway officer and employee. What the railroads are to be in 2048 may seem of little personal consequence to present railroad personnel, but the contrary is true. What the railroads are to be then will depend in large measure upon what they are tomorrow, next year, in five years, ten years, twenty-five years—and what they will be in these earlier years ahead *is* of consequence to present employees.

The statement often made in jest that "the first one hundred years are the hardest" is hardly apropos to the railroads in the light of the present and the predictable future. True, there have been many difficult and trying times in the railroads' past, but it has been a past which has been favored until recent years with near monopoly in the mass transportation of both people and commodities. Come what may, they could always be assured of the lion's share of what business was available.

This favorable condition, which has been the Fairy Godmother of most railroads in times of trouble, no longer prevails. Today the railroads are confronted with competition on every hand—competition that has undeniably attractive features, competition that is alert and aggressive, and competition that in many ways is fostered and strengthened by federal, state and municipal subsidies. In the future the railroads will have to do more than rest on their oars. They will have to fight for their progress and well-being every step of the way—fight with all of the enthusiasm, aggressiveness, initiative and imagination they can muster.

One thing they will have to do successfully is to win from the government and regulatory bodies a more equitable deal in taxation and regulation with relation to their competitors. They must be successful in their fight for the elimination of unfair subsidies now given their rivals in transportation. They must better their service to the public immeasurably through the adoption of every technological development that will bring improvement and lower costs. They must improve their relations with the public and with their employees. In all of this there is no room for small thinking, no room for weak compromise, no room for blindly holding to precedent; the field for improvements all along the line must be wide open and cultivated aggressively. This will be no job for management alone. Management is plainly involved and in major ways, but the job will call for cooperation from every department and from every supervisory officer and every employee in every department. (*Continued on page* 914)

In celebration of their last 100 years of service to the country on Chicago's waterfront the railroads could well seize upon the spirit behind and within the slogan, "A Past of Achievement—A Future of Opportunity," adopted by the American Railway Engineering Association to keynote the commemoration this year of its first half-century as an organization. This association may well glory in its achievements of the past, but it would fall far short of its possibilities if it did not in this semi-centennial year emphasize, not the past, but the opportunities that lie ahead.

Possibly from the A.R.E.A. and from its sister organizations—the Roadmasters' and Bridge and Building Associations—dealing with the construction and maintenance of the fixed properties, may come the inspiration that will spark the entire railroad industry to new heights of achievement. But to gain this enviable position of leadership will require new vision on the part of many in the departments represented by these associations—a revival of the pioneering spirit, and an unwillingness to accept things as they are.

Truly, challenged as they are on every hand by competition and by political and economic conditions, there is a future for the railroads crying with opportunity. Always an outlet for initiative and enterprise as they grew, developed and expanded, there is today greater opportunity on the railroads for these qualities than in any other period.

No one can now know what the railroads will be like after another 100 years have passed, but one thing is certain, and that is that they are moulding their future now—five years ahead, ten years ahead, 25 years ahead, and even 100 years hence.

Flame Cleaning—

Showing Gains in the Maintenance Field

THE use of the oxyacetylene flame for cleaning metal surfaces in preparation for applying paint or other coatings has grown rapidly on the railroads in recent years—and is still gaining in popularity. Like many other methods and practices of basic economic soundness the growth of flame cleaning is partly accounted for by its extension to new applications that were not immedately apparent when it was first introduced. And it would not be surprising if many additional applications were to be found for this versatile process as time goes by.

Application of the flame-cleaning process in railroad maintenance work was initially confined almost entirely to the cleaning of surfaces on steel bridges in preparation for painting them. Its use for this purpose is now standard practice on some roads, while many others use it at least to some extent. Beyond its application as a means of cleaning surfaces where painting is contemplated, some companies regard the method as a general-utility tool for use by steel gangs wherever any cleaning of bridge members is required, such as in preparation for welding.

Now the application of flame cleaning has extended to the track structure, where the possibilities would seem to be equal at least to those in bridge work. As far as is known the Norfolk & Western was the first large user of the gas flame for removing the mill scale from rails; it is now standard practice on this road to flame clean and oil all surfaces of rails destined for installation in road crossings and tunnels.

Another railroad, faced with a serious corrosion problem involving the rails in many miles of tracks, is experimenting with a scheme for flame cleaning such rails in track to prepare them for receiving a protective coating. At least one company, when laying rail, is flame cleaning the ends of rails in the joint-bar areas before applying a lubricant to keep the joint bars from "freezing." Probably other roads are making use of the process in track work for these or other purposes.

When viewed from one angle, flame cleaning is a process that performs a job better and more economically then can be done by hand, a factor of growing importance as wages go up. Looking at the method in another light it offers a means, in at least some instances, of accomplishing something highly worthwhile that otherwise would have to go undone.

Conventions—

Attendance of Younger Men Is Desirable

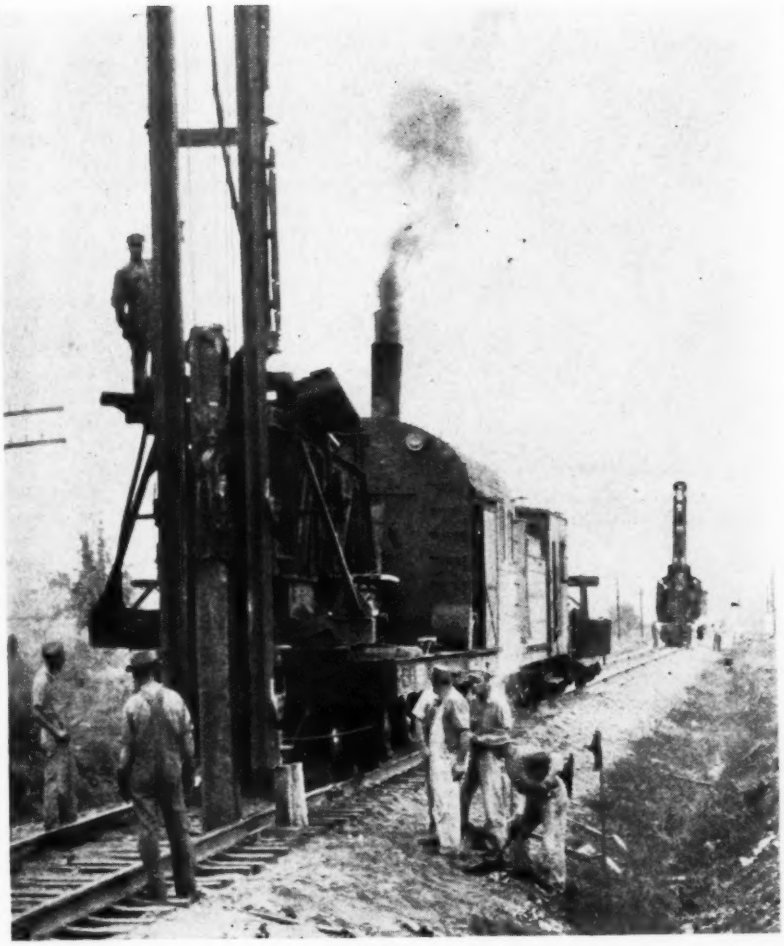
SEPTEMBER might well be termed "convention month" for field supervisory officers in the maintenance of way and structures departments. This has been true since the Roadmasters' Association and the Bridge and Building Association started the practice three years ago of holding their conventions concurrently during September.

Attendance at the conventions this year has a triple appeal. Not only will those present enjoy all the advantages of the meetings themselves and of inspecting a large exhibit of manufacturers' products, but they will have the opportunity of reviewing the Railroad Fair at Chicago—a really amazing show on a grand scale, designed to dramatize railroad transportation. The fact that the American public is willing in large numbers to pay hard cash to see this spectacle is proof enough that it is worth seeing. To railroad men it should prove doubly worth while, for it is reassuring evidence of the virility of their industry.

There is much to be said regarding the advantages of membership in associations, and of participating in their activities. These advantages have been repeated time and again over the years and there would seem to be little to gain by indulging in further repetition here. However, there is one qualification necessary to this statement because of the desirability of acquainting the younger members of supervisory staffs with the benefits of belonging to these associations.

The most effective way of putting this thought into action is to make it possible for those younger men to attend the meetings so that they may experience the stimulation to thought and learning that results from such attendance. There is no better way to assure the future success of these associations, or of helping promising supervisory material to get started on the right track, than to encourage the younger men to attend these meetings. With the Railroad Fair to see, the present year should be an opportune time to get these younger men in the habit of attending the conventions.

Part I of this article, which appeared in the August issue, described the "blasting-and-sanding" method of roadbed stabilization as introduced and practiced on the Washington division of the Southern. In this article the "sand-pile" method is described as it is being used throughout the Southern's Central and Western lines.



The procedure calls for using a 12-in. by 12-in. timber as the driving spud, which is driven, as shown here, only to a depth that will permit its being pulled with the pile line

Sand "Shots" Cure "Ailing" Roadbeds

Part II

SAND piles—established by repeatedly driving a timber spud into the soil, pulling it and filling each hole with sand—while not new as a means of consolidating unstable soil*, were first used to stabilize railroad roadbed when they were introduced on the Southern in 1946. The first application on the Southern was made at Camp Sibert, Ala., 90 mi. south of Chattanooga, Tenn., and proved so effective that this method is now in regular use as part of the roadbed stabilization program on the Western and Central lines.

Essentially, sand piles and their use in roadbed stabilization involve the driving of a timber spud repeatedly into the roadbed according to a pattern, inside and outside the tie area, depending upon conditions encountered, withdrawing the spud, and immediately filling these holes with sand. Driving and pulling of the spud is done with a pile driver or crane equipped with leads, and the holes are filled with sand by laborers working with wheelbarrows and shovels.

Everywhere this method of stabilization has been employed on the Southern it has accomplished the results desired, permitting the lifting of slow orders and eliminating abnormal track maintenance costs.

At Camp Sibert there were two soft places, about 200 ft. apart, having a total length of about 1,800 ft. Here the track had been operated under a slow order of 10 m.p.h. for four years, or since a grade reduction project, including the removal of a summit, had been carried out in 1942. At Morganville, Ga., the second location where sand piles were installed, conditions were similar, except that the amount of track involved was about 1,300 ft. At each of these locations the track was located in a cut and the roadbed material consisted of a plastic clay underlain by an irregular rock formation at depths of from 2 to 8 ft. Subdrainage had been tried on a small section at Camp Sibert without improvement. At Morganville timberpile "squeezers" had been driven, but these immediately began to work upward and did not accomplish the desired results.

Maintenance Cost High

The track had been maintained on cinders after the grade reduction project in 1942 at Camp Sibert had lowered the summit 9 ft. These cinders tended to work down into the clay. Ample ditches were provided through the cut, but required constant cleaning to keep them open. Very little water appeared in the ditches except after heavy rains, when surface water flowed in them. The subgrade was so soft that clay worked up between the ties inside and outside of the rails to such an extent that it had to be dug out periodically and hauled away. Just beyond the ends of the ties, ridges pushed up to such a height as to require removal to prevent the steps of passenger cars from striking them. During dry weather it was necessary to surface the track at least three times each week. In rainy weather it was not only necessary to keep a gang in the cut continuously during the day but also to provide

*George T. Powell, in his book "Foundations and Foundation Walls," copyrighted in 1879, said that solid foundations could be secured on underlying soft ground by "excavating holes through the soft ground and filling with sand or by driving down a wooden pile, withdrawing it, and filling the hole with sand."

After pulling the spud, the hole is filled with sand. When a spud is pulled with the pile line, it is necessary to use blocking, as shown here, under the pile driver lead

men to keep the track smooth after working hours. During 1944 alone, the wages paid to section men and work-train crews for work at this location amounted to about $5,500.

In applying the sand-pile method of stabilization at this location, it was decided to drive the timber spud in predetermined patterns to secure uniform treatment and, for experimental purposes, to obtain three different percentages of sand area. An accompanying illustration gives the patterns designed to provide the three percentages which were to be tried. The first 100 ft. of track was given a 30 per cent treatment. This was found to be expensive. The treatment was then reduced to 20 per cent, and, when the results were found to be satisfactory, the work was continued on this basis except for the last 100 ft., which were treated with 10 per cent of sand. This latter percentage was judged to be insufficient for this location, with the result that an additional 10 per cent was added to the last 100 ft. The stabilizing effect of the sand-pile treatment was apparent immediately at Camp Sibert. The Morganville location was then treated in a similar manner, using the 20 per cent treatment. Since then more than 100 additional locations have been treated.

Cost Saved in First Year

After the treatment had been completed at Camp Sibert, the track was surfaced to provide eight inches of slag ballast beneath the ties. When this had been done the slow order was removed and trains were operated at scheduled speeds for the first time in six years. During the first ten days after the removal of the slow order a total of 44 man-hours of labor was required to overcome settlement in the 8-in. shovel-tamped raise. In the next six months no special work was required.

Although this was the first undertaking of this kind on the Southern, the cost averaged only about $2.00 per track-foot. Thus, by an expenditure of less than $5,000, a 10-m.p.h. slow order was removed and maintenance costs were reduced to practically nothing during a six-month period, in contrast to the $5,500 which had been spent in 1944 to maintain the track to a slow-speed standard.

At other locations this type of work has been done for $1.25 per track-foot, using two on-track pile drivers with the same work train. It is expected that as the result of improvements now being made in some of the equipment the cost can be reduced to $1.00 per track-foot. Experiments made so far with off-track drivers have not resulted in reducing costs, but it is still hoped that such results can be attained.

How It Is Done

Out of the experience gained in making the installation at Camp Sibert, a standard method of doing the work was evolved. The procedure calls for the use of a 12-in. by 12-in. timber, 10 to 12 ft. long, as the driving spud. The lower 2 ft. of this spud is tapered to an area at the end of 10½ in. by 10½ in. This permits the spud to be set between crossties and, as it is being driven, to wedge them back without damage. Thus the necessity for stripping ballast or removing ties is avoided. Unless the taper is provided the spud will gouge the sides of the ties.

The spud is driven only to a depth that will permit its being pulled with the pile line. If overdriven it cannot be pulled in this manner, but must be jacked out—a slow and expensive process. If by chance a spud is so driven that it cannot be pulled with the pile line, it is sawed off. The depth of spud which can be pulled with ease by the pile line can be quickly determined and that depth is then considered controlling. Usually several hundred holes are driven with one spud. If a boulder formation underlies the track more than the usual number of spuds are lost owing to their wedging in crevices. Places have been successfully treated where rock was encountered only 12 to 18 in. under the track and where the spud went to the rock under the weight of the hammer. Very few holes have been driven deeper than 6 to 8 ft., and most of them have been limited to 6 ft.

Experience has shown that it is preferable to unload the sand from side-dump ballast cars in a work train rather than to dump it in the track from hopper-bottom cars. Use of the latter type cars has been found to result in waste of sand and fouled ballast. With ballast cars the outside gates on the cars are lowered one at a time, dumping directly into rubber-tired wheelbarrows which are used to handle the sand directly to the holes. Where a work train is not used the sand is unloaded on the track shoulder before the work starts. Any sand, except quicksand, will suffice, providing it does not contain too much clay. Engine sand, being plentiful, is usually used.

In driving the holes according to any of the patterns decided upon, it has been found from experience that it is most effective to stabilize the track in stretches of one-half to one rail length at a time. It has also been determined that if a hole is driven adjacent to one that has not been filled with sand, or even if the spud is landed preparatory to driving the second hole, the first will be squeezed in and closed. Consequently, to prevent this, and also to provide a safe area in which laborers can fill the holes with sand immediately, holes are driven alternately, and those outside of the ends of ties are driven first. If the weak roadbed affects both sides of the track, the corresponding holes outside the opposite ends of the ties are driven next. After all the alternate holes outside the ends of the ties have been driven, the remaining holes at or beyond the ends of ties are driven. This process is repeated with the next adjacent longitudinal row of holes, thus working toward the center of the track. Using this procedure, the average hole is driven and filled in 90 sec. of actual working time.

Driving the spuds causes the track to heave. The 20 per cent treatment raises the track as much as three

inches; smaller treatments correspondingly less. It is necessary, therefore, to do the work under a slow order, which is generally 10 m.p.h., so that the runoffs can be short.

Under no circumstances are the runoffs made by tamping material under the ties. If a runoff is made in this manner, where the track has not yet been treated, the later treatment will cause a heave to be added that will first have to be surfaced out and later dug down. This is avoided by driving a few spud holes ahead each time it is necessary to make a runoff. The heave thus created produces a runoff without the use of jacks. This is a simple operation in which the crew soon becomes expert. Later, as the treatment is completed, the track is heaved to the plane of previous work, producing a uniform grade.

Small Force Required

The force required to stabilize track by this method is small—a foreman, and eight men, in addition to the pile-driver crews. Usually two pile drivers are worked together, several hundred feet apart, so as to make more efficient use of track-occupancy time. One man is stationed on each pile driver to relay signals and to direct the setting of the hammer on the spud. Two men set blocks and wedges under the pile-driver leads and guide the spud. Three men shovel sand into the hole just as soon as the spud is withdrawn. One man knocks off and resets rail anchors, regulates the amount of sand distributed along the shoulder, wheels ahead any sand that is left over, and generally cleans up behind the gang. A general-utility man carries water and assists wherever he may be needed.

The manner in which the work is carried out is varied to suit the exigencies of the location. Spuds are commonly driven by on-track pile drivers or locomotive cranes, with or without work-train service. If a work train is not used the outfit must work within 1,000 ft. of a switch. Off-track crawler cranes with pile-driver leads are used where conditions permit. As these crawler cranes are not steam driven, compressors are furnished to supply air to operate the hammer. Details of the use of crawler equipment are being improved so that the economies inherent in this type of equipment can be realized more extensively.

As stated, more than 100 locations have been treated by this method since it was first introduced in 1946. In every case the experience parallels the excellent results obtained at Camp Sibert where the roadbed has evidently been stabilized. Nothing has occurred to indicate that the long-term results with the sand-pile treatment will be any less effective than those already demonstrated.

How Sand May Work

Eventually it is intended to excavate into some of the treated roadbed to determine what has actually happened to the sand. Until that is done only theories can be advanced as to why the sand-pile and blasting-and-sanding methods produce such excellent results. In addition to the theories set forth in Part 1 of this article, on which the blasting-and-sanding work was predicated, the following suppositions have been applied specifically to the sand-pile system:

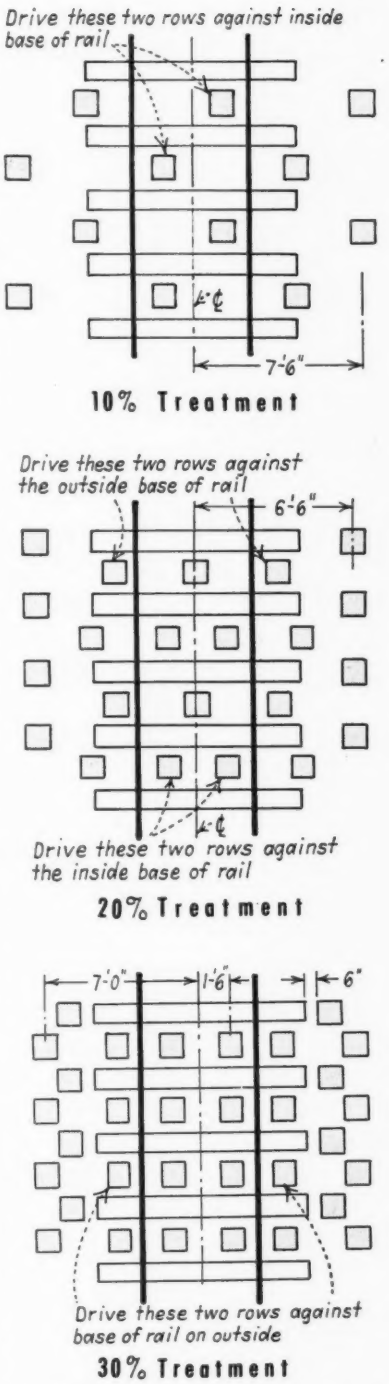
(1) In his Civil Engineers Pocket Book, Mansfield Merriman says, "Experiments show that in compacting the soil by driving wood piles, it is better to withdraw them and immediately fill the holes with sand. When the wooden pile is driven, it compresses the soil an amount nearly or quite equal to the volume of the pile. If the hole is immediately filled with sand this compression is retained permanently. The consolidation may be still further increased by ramming in the sand in thin layers, owing to the ability of the latter to transmit pressure laterally. And further, the sand pile will support a greater load than the wooden pile, for, since the sand acts like innumerable small arches reaching from one side of the hole to the other, more of the load is transmitted to the soil on the sides of the hole."

(2) The sand and clay may intermix to a certain extent resulting in the stiffening of the clay. This concept is based entirely on the fact that additional internal friction is provided.

(3) The sand introduced may serve as a sub-ballast of considerable depth, stabilizing the track by helping to distribute the load.

It is the general belief on the Southern that the principal benefits of the sand-pile method can be attributed to the intermixing of the sand and clay, although it is believed that some help is derived from the fact that a deep sand sub-ballast is provided. Whatever the actual initial effect of the sand pile may be the engineering officers of the Southern are impressed with the fact that it works, and are concentrating their efforts on reducing the cost of its installation.

All installations of the sand piles on the Southern have been made under the general direction of J. B. Akers, chief engineer system, and G. L. Sitton, assistant chief engineer system. The work on both the Central and Western lines has been done under the supervision of the respective chief engineers maintenance of way and structures of these lines—D. W. Brosnan, R. F. Logan and J. S. Wearn. Mr. Brosnan made the original suggestion and directed most of the development work.


Drive these two rows against inside base of rail
7'-6"
10% Treatment
Drive these two rows against the outside base of rail
6'-6"
Drive these two rows against the inside base of rail
20% Treatment
7'-0"
1'-6"
6"
Drive these two rows against base of rail on outside
30% Treatment

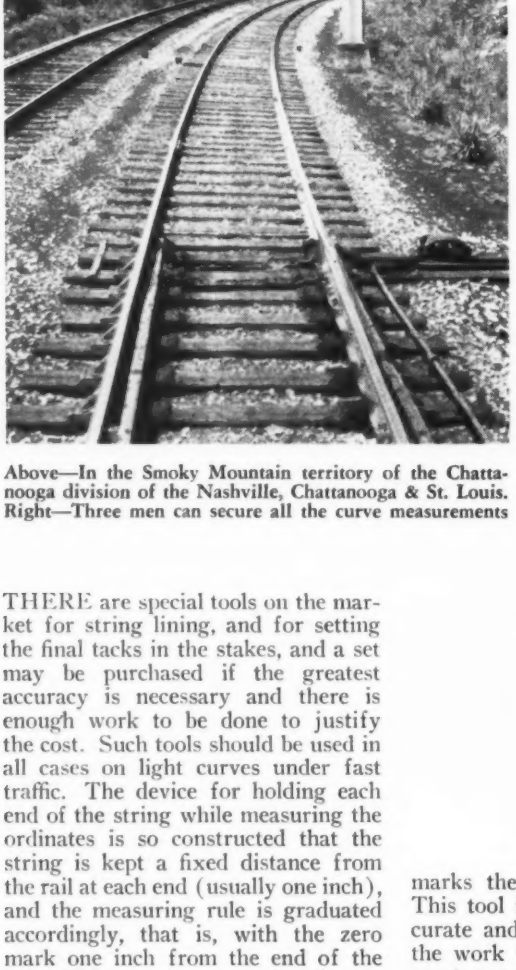
Spud-hole patterns for treating 10, 20 and 30 per cent of the area of the roadbed

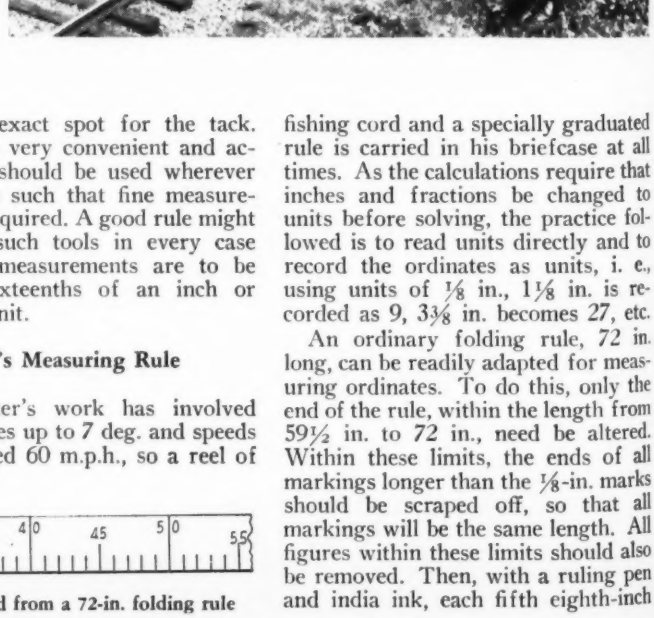
Maintaining Curves With a String—

Calculating the Throws

Part II of a Series

By W. H. Lord
Assistant Division Engineer
Nashville, Chattanooga & St. Louis
Chattanooga, Tenn.





Above—In the Smoky Mountain territory of the Chattanooga division of the Nashville, Chattanooga & St. Louis. Right—Three men can secure all the curve measurements

THERE are special tools on the market for string lining, and for setting the final tacks in the stakes, and a set may be purchased if the greatest accuracy is necessary and there is enough work to be done to justify the cost. Such tools should be used in all cases on light curves under fast traffic. The device for holding each end of the string while measuring the ordinates is so constructed that the string is kept a fixed distance from the rail at each end (usually one inch), and the measuring rule is graduated accordingly, that is, with the zero mark one inch from the end of the rule. This permits measuring directly any kinks in the tangents, recording the readings with a minus sign (—) before them if the measurement falls between the zero mark and the end of the rule. The tool for setting the tacks is equipped with a bubble to assure that it is held in a horizontal position, and with a sliding pin which marks the exact spot for the tack. This tool is very convenient and accurate and should be used wherever the work is such that fine measurements are required. A good rule might be to use such tools in every case where the measurements are to be made in sixteenths of an inch or other fine unit.

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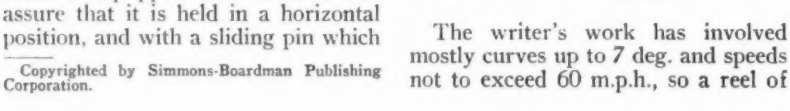
The Author's Measuring Rule

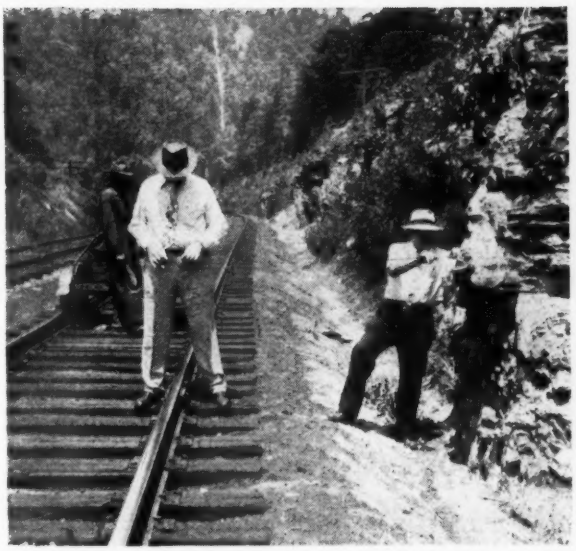
The writer's work has involved mostly curves up to 7 deg. and speeds not to exceed 60 m.p.h., so a reel of fishing cord and a specially graduated rule is carried in his briefcase at all times. As the calculations require that inches and fractions be changed to units before solving, the practice followed is to read units directly and to record the ordinates as units, i. e., using units of ⅛ in., 1⅛ in. is recorded as 9, 3⅜ in. becomes 27, etc.

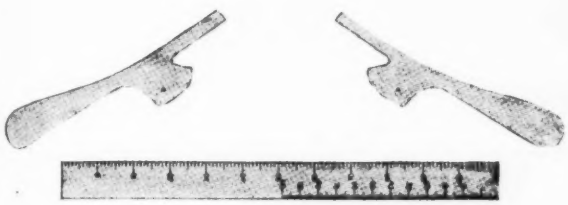
An ordinary folding rule, 72 in. long, can be readily adapted for measuring ordinates. To do this, only the end of the rule, within the length from 59½ in. to 72 in., need be altered. Within these limits, the ends of all markings longer than the ⅛-in. marks should be scraped off, so that all markings will be the same length. All figures within these limits should also be removed. Then, with a ruling pen and india ink, each fifth eighth-inch

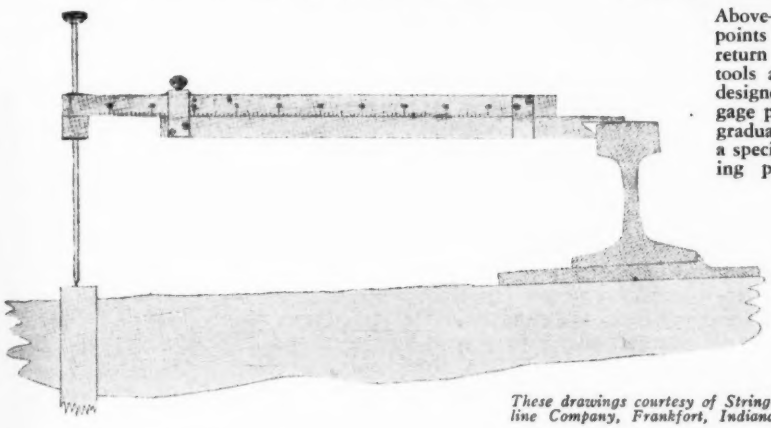


The ordinate-measuring end of the author's rule, as adapted from a 72-in. folding rule

This is the second in a series of six articles describing in detail the fundamentals of using a string in the most effective manner to correct the alinement of simple, compound and reversed curves. Part I, which appeared in the August issue, discussed the problems involved, the basic principles of string lining, the significance of the units of measurement used, and the various steps in making the field measurements and notes. In Part II, following a description of the tools used in the field work and special field measurements desirable, the author begins consideration of easement spirals and of the work of calculating the throws.







These drawings courtesy of Stringline Company, Frankfort, Indiana

Above—Side measurements to all obstructions or points of restricted throws are taken with a tape on a return trip over the curve. Left—Three precision tools available for string lining work—top, blocks designed to hold the string exactly one inch from the gage point of the rail; center, a steel rule, specially graduated to make precise ordinate readings; below, a specially-designed gage, with level bubble and sliding pin for the accurate setting of the tacks

mark should be extended half-way across the rule and each tenth mark all the way across. Then number these marks 5, 10, 15, etc., consecutively, to 100, which will bring the last mark 12½ in. from the end of the rule. One hundred units will be enough to measure the ordinates of all ordinary curves in main track. The ink markings can be preserved for a long time by giving the rule a coat of clear varnish after marking.

Incidentally, another part of the rule may be marked for setting the tacks in the stakes for lining the track, but in this case the marks denoting quarter inches should be used and numbered from a zero located 28¼ in. (one-half standard gage) from the end of the rule. These marks should be numbered by fives each way from the zero to 50, which is sufficient for throws limited to 12 in. either way from the center of the track. If both of these special markings are made on one side of the rule, the other side can be used for its normal purpose. These rules usually have a metal tip on each end, which prevents serious wear at these points.

For the more accurate measurement of small ordinates of curves and slight kinks in the adjacent tangents, a couple of short pieces of ⅝-in. dowel stock are carried along and inserted vertically between the head of the rail and the string at each end, thus obtaining a 5-unit offset at these points. The recorder thus reads larger ordinates, but deducts, mentally, five from his readings as long as the dowels are in use. He sees that the dowels are used by both stringmen when the ordinates are small, and that their use is discontinued when the readings have increased to 10 or more. Care, of course, must be taken to allow for the offset on every reading taken with the dowels in place, as any failure to do so would result in a flat place in the finished curve, which would cause it to get out of line again.

The recorder should number the lines in his book in advance, and should record each ordinate opposite the proper station number immediately after it has been measured and checked. Any delay in doing this may result in confusion or forgetting the figures. He should note also the locations of any switches, frogs, culverts, beginnings and ends of bridges, any narrow roadbed or close rock cuts, buildings, signals, battery boxes, mail cranes, piers of overhead structures, water columns, track or road crossings, or anything else that will prevent the lining of the track, or that will have to be moved before the track can be lined toward it. Usually it is sufficient to estimate the locations of such obstacles to the nearest quarter station. However, a mile post or valuation station marker, or other fixed point of known location, should be tied in to the curve with a tape measurement so that proper record of the curve can be made.

Side measurement to each obstruction is taken with a tape on a return trip over the curve, the recorder indicating to the stringmen each measurement he desires. Clearance from station platforms, adjacent tracks and retaining walls should be measured at each station on spirals and as often as necessary on the body of the curve. Care must be exercised also to obtain sufficient data to cover any change in location of point of compound curve, if any, as such points frequently need to be moved ahead or back a few stations. The existing elevation of the outer rail should be measured at every station on spirals and as often as needed elsewhere. Any unusual curve wear on rails should also be noted, and the elevation measured at these

The existing elevation of the outer rail should be measured at every station on spirals and as often as needed elsewhere

Whether in the field or the office, the computer should seek a place to work where he can concentrate without interruption

points to see if the wear is caused by line or surface variations. It is good practice to obtain all information that may be useful while on the ground to avoid any delay later.

Excessive wear of the outer rail indicates too much speed for the elevation, while a hammered condition of the inner rail indicates too much elevation for the average speed. Of course, the service life of the rail must be taken into consideration also, but the above mentioned conditions frequently are the best indication of any change needed. On grades, the average speeds over double or multiple tracks may be estimated closely, but on single tracks some compromise must be adopted as the speeds in one direction will vary considerably from those in the opposite direction. While a long curve on a grade might have different speeds at each end, it is not advisable to vary the amount of elevation of the outer rail unless there is a distinct change of degree of curve also.

The notes taken in the field should be plain and neat and should be in permanent form, as any attempt to copy them may result in errors creeping in which will affect the final curve. The final solution should be entered in the same book as the field record, after computing, and a final check of the computation can be made by refiguring it against the original notes.

Care Necessary in Computations

It is not the best plan to measure, compute and set the stakes all in the same day or trip. The computing should be done carefully in a quiet, comfortable place, free from interruptions, and the best solution possible obtained. Otherwise, the first acceptable solution may be staked out, even though the throws may be excessive and the alinement not as good as desired. Sometimes this is necessary, however, in which case the computer should examine his work very carefully, station by station, before setting the stakes.

It is very important that the computer has a quiet place to work. It is impossible to concentrate on a mass of dry figures while near a gang at work or in an office where one is subject to interruptions from other employes or by the telephone. If not afforded quiet surroundings, small errors are likely to creep in unnoticed, which may not be discovered until the finally selected ordinates are entered in the original note book and the curve is being freshly re-figured as a final check. The final half-throws will be different and the final figures in each column will not be zero, when they must be to prove that the work is correct. Any slight error discovered then will require that the work be done over again with an unnecessary waste of time and effort. The more a computer can be protected from interruptions the better the results of his work will be and the quicker his part of the work will be done. This will also permit the stakes to be set before the track conditions have changed appreciably.

Having a list of the measured ordinates and the side measurements to everything that can limit or affect the final alinement, the computer can proceed to figure the amount of throw necessary at each station to aline the curve. As the method of figuring consists of trial and error, the recorded notes in the field book are not themselves used, but are carefully copied and checked on a work sheet where the actual computations are carried out.

A common slate, ruled in lines and columns, is the best thing to use for this purpose. As the work proceeds, each time the throw becomes excessive or in the wrong direction, it is necessary to go back and try a slightly different solution; sometimes returning to Station 1, and at other times only backing up a few stations. This, with its continual erasures, would destroy any paper sheet, whereas such erasures can be made readily on a slate.

The slate should be divided into 12 columns, the first six being about ½ in. wide. These should be followed by a wider space and then four more ½-in. columns. The rest of the space should be left for guide notes. Each column has a specific purpose as follows:

Column No. 1 is for the station numbers.

Column No. 2 is for the measured ordinates.

Column No. 3 is for the trial ordinates.

Column No. 4 is for the differences of errors.

Column No. 5 is for the net sum of the errors.

Column No. 6 is for the resultant half-throws.

Column No. 7 is used to keep track of trial changes.

Column No. 8 is for next trial ordinates.

Column No. 9 is for the new differences.

Column No. 10 is for the new net sum of errors.

Column No. 11 is for the new half-throws.

Column No. 12 is for such notes as the computer needs to keep before him at all times to guide him, such as the location of obstacles to be cleared, points through which the final line must pass, existing clearance from parallel tracks or platforms, etc.

Columns 8, 9, 10 and 11 are duplicates of Columns 3, 4, 5 and 6, and are used to try out any proposed changes in ordinates when the computations have produced an undesired amount of half-throw in Column 6. It is unnecessary to repeat the station numbers or the original ordinates as they can be seen readily across the slate and do not require changing as do the figures in the other

columns. By carrying two trials side by side, the better solution can be selected, and the point to back up to, when necessary, can be determined readily. Sometimes it is necessary to carry through two entirely separate solutions and compare them station by station to see just what changes are necessary to aline the track where it is desired it should be.

The Spiral

After the station numbers and the original measured ordinates, as recorded in the note book, are listed on the slate and checked so that they are known to have been correctly copied, inspection of the ordinate column will show that some of the ordinates at the beginning of the curve will be increasing in value. These are on the spiral or easement curve that connects the tangent with the body of the regular curve.

The length of the spiral depends on the distance necessary to obtain the full elevation required for the degree of the curve and the speed of the trains which will operate over it. All railroads have fixed rules for the amount of elevation for various speeds on different degrees of curvature up to a maximum amount — usually six inches. If greater elevation is required for safety on sharp curves, the speed of trains around such curves is restricted to one which is safe for the maximum elevation permitted.

The minimum length of spiral should not be less than 1.2 times the authorized speed in miles per hour, multiplied by the number of inches of elevation used in the regular portion of the curve. However, this length should not be less than 40 ft. per inch of rise, nor usually more than 80 ft. per inch; the first because at anything less than 40 ft. per in. the rise is quite noticeable to those riding in trains, and the latter because most railroads use gradation marks on their track level boards for each ½-in. increase in elevation, and ½ in. per rail is about the practical limit for the trackman to use with his level board. If smaller rates of rise are necessary on account of speeds higher than 65 m.p.h., adjustable levels should be provided and the trackmen required to use them at each point where the elevation increases by ¼ in.

There are many possible spirals, but only one type is suitable for track work and that is a spiral which increases in degree of curvature, from tangent to the degree of the regular curve, at a uniform rate. This means that the middle ordinates of the chords in the spiral increase as the distance from the beginning of the spiral increases, up to the value of the ordinates in the regular curve. As the elevation of the outer rail also increases uniformly from level at the start to full elevation at the point where the spiral joins the circular curve, the tendency to overturn is exactly balanced throughout such a spiral. A perfect spiral has ordinates increasing as follows (see Figures 3 and 4):

Stations	0	1	2	3	4	5	6	etc.
Ordinates	1/6	1	2	3	4	5	6	etc.

In this perfect spiral, it will be noted that the ordinate at Station 0 is ⅙ of the uniform rate between other stations. However, since the first two ordinates of the spiral are usually quite small, the first ordinate can, for all practical purposes, be written as 0, without introducing any appreciable error. Remembering this, therefore, a spiral with a rate of 8, for example, may be set down as follows:

Stations	0	1	2	3	4	5	6	etc.
Ordinates	0	8	16	24	32	40	48	etc.

The rate need not be a whole unit. If fractional, for example, a 3½ spiral could be:

0 3 7 10 14 17 21 etc.

or it could be:

0 4 7 11 14 18 21 etc.

Also, remembering that the first increment might be ⅙ of the rate, a rate 9 spiral could be:

1 9 18 27 36 45 54 etc.

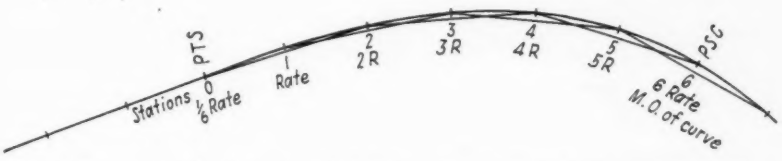
or it could be:

1 10 19 28 37 46 55 etc.

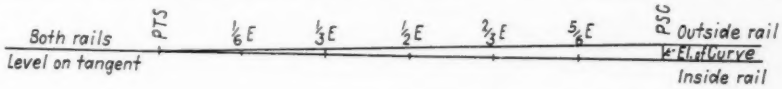
or it could even be:

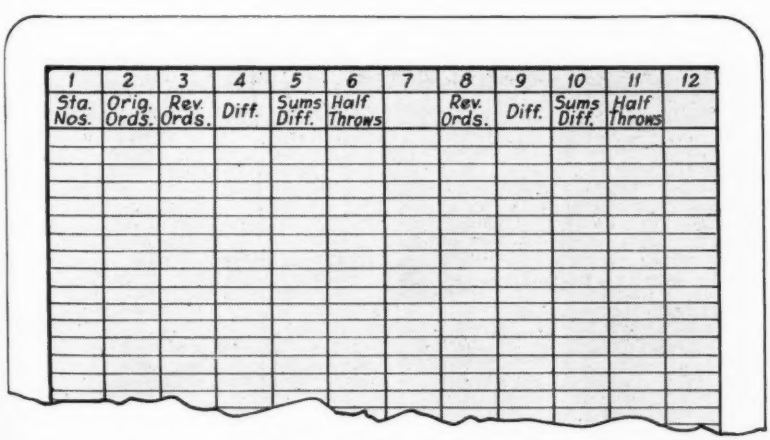
2 11 20 29 38 47 56 etc.

Sometimes it is necessary to start or finish a spiral with a fractional station, an expedient which often makes the entire curve fit better and reduces the amount of throw. In such a case a spiral with a rate of 10 could have ordinates as follows: 5, 15, 25, 35, 45, 55, 65, 75, etc., or 72, 62, 52, 42, 32, 22, 12 and 2. The first of these spirals would begin half-way between stations and the latter would end ⅕ of the distance beyond the station which had an ordinate of 2. All of the foregoing spirals are suitable for string-lining work, the only requirement being that the ordinates increase or decrease at a uniform rate. Between the spirals, that is, on the regular curve itself, the ordinates should have as nearly as possible the same value throughout.



Above—Fig. 3—A perfect 6-station spiral. Below—Fig. 4—Elevation of outer rail on spirals





A section of the slate recommended by the author for making the curve calculations

"Duck's-Back" Construction

Waterproofs Track on Famous Ni

By T. E. BATZOLD
Division Engineer
New York Central
St. Thomas, Ont.

ONE OF THE largest, most thorough and effective bridge-deck waterproofing jobs ever carried out on the railways was completed recently in the waterproofing, above and below ballast, of the deck of the Michigan Central's (New York Central's) 977-ft. double track Niagara River Arch bridge, extending between Niagara Falls, Ont., and Suspension Bridge, N.Y. There, where the fouled condition of the ballast dictated the desirability of its renewal, the old deck waterproofing was repaired, new ballast applied, and the final ballast section, across both tracks, was paved with a two-inch thickness of asphalt to shed all surface water to newly formed side gutters. Taking one half of the bridge out of service at a time, and employing a number of special tools and gang organizations, the work was carried out expeditiously and effectively, resulting in a deck waterproofing job which will hold the road's famous arch in good stead for many years to come.

The Niagara River bridge was constructed in 1924 and was put in service in February, 1925. It is composed of a 640-ft. steel arch span, with a 125-ft. steel girder approach span on the east end, and a 100-ft. steel girder approach span on the west end, together with a 112.5 ft. concrete span over Front street in Niagara Falls, Ontario.

The total width of the bridge is 31 ft., which includes a track roadway section 25 ft. wide, with a 3-ft. precast concrete slab sidewalk on each side.

The entire structure has a steel-deck ballast floor, with approximately 6 in. of stone ballast under the ties. This ballast, which had been in place since the erection of the bridge in 1924, had become badly fouled due primarily to the use of sand by locomotives hauling transfer runs in both directions at slow speeds to permit the checking of cars by the customs.

Former Drainage System

The waterproofing on the deck, as built, consisted of an asphalt mastic over the entire deck plate, varying in thickness from 1¾ in to 1 in., to provide grades for drainage to the down pipes. A two-ply membrane was applied over the mastic and protected with 1½ in. of asphalt mastic.

Drainage for the east and west approach spans consists of down pipes spaced approximately 10 ft. apart along the center line of each track. These pipes are 2 in. in diameter and extend from the top of the ballast, through the deck, to a point below the steelwork of the bridge. At the top end, and also immediately above the waterproofing, each of these pipes is slotted to allow surface water to enter, as well as the water that seeps through the ballast to the deck of the bridge.

The deck over the arch consists of 16 bays or floor sections, each 40 ft. long, which are separated by expansion joints, allowing each section to drain separately. The mastic waterproofing on the deck of each panel is sloped toward the four corners of the panel, at each of which points there is a 5-in. down pipe that extends from the top of the ballast, through the deck, to a point below the steelwork of the arch. Like the down pipes on the approach spans, all of these down pipes are slotted at the top of the ballast and immediately above the waterproofing to allow water to enter. The Front Street span is drained in a manner somewhat similar to the drainage system on the arch span, the down pipes being located outside of the tracks, along the sidewalks.

Completely Clean Old Deck

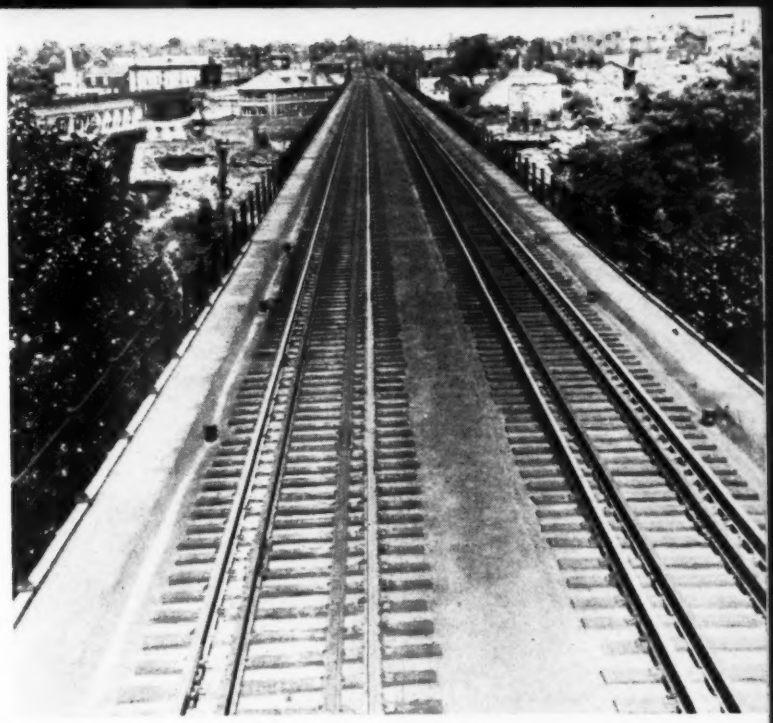
The proposed work called for removing both tracks, one at a time, cleaning off all the old ballast, re-

Cleaning off the old crushed-stone ballast with a Burro crane

Air-blasting to remove dust before applying new waterproofing

Niagara Arch

Following complete renewel of ballast on the New York Central's double-track, 977-ft. bridge over the Niagara gorge between Niagara Falls, Ont., and Suspension Bridge, N.Y., which involved careful cleaning and repair of the old deck waterproofing and drainage systems, the final ballast section was surfaced with two inches of asphalt paving material as a top waterproofing. Details of how this work was carried out are explained in this article by the author, who was in responsible charge of operations in the field.



View of the bridge after completion of the waterproofing job. Care was used in finishing the asphalt paving to maintain a grade to the gutters

pairing or renewing the down pipes, applying a fresh mopping over the deck, waterproofing, placing new stone ballast and sawed ties, and applying asphalt paving over the ballast finishing with a waterproof spray coat of bitumens and a coating of sand. This plan called for the diverting of traffic from one track to the other during the course of the work, but the track layout at each end of the bridge was such that this could be done without constructing any new crossover. In the actual work the eastward track was taken out of service first, followed by the westward track.

Before single-tracking the bridge, all of the excess ballast on the bridge, including that in the cribs of both tracks to a depth approximately half way down on the ties, was removed. This excess ballast was thrown into the six-foot, from where it was loaded in hopper cars by a Burro crane.

When removal of the excess ballast had been completed, the eastward track was taken out of service and its removal, together with its double guard rails, was started at the east end of the bridge. All ballast and other material were handled with the Burro crane.

As the ballast was cleaned off and the waterproofing exposed, it was found that the ballast directly under the ties was imbedded in the protection coat. To remove these imbedded stones it was necessary to use air guns with regular tamping bits that had been slightly chisel pointed at the ends. These bits proved very satisfactory in loosening up the stones.

After the ballast had been removed the surface was swept, and then, as it was necessary to have the surface free of dirt and dust before applying the new waterproofing coat, it was air blasted clean with nozzles made for ths purpose. These nozzles were made from ½-in. pipe about 42 in. long, with a brazed end in which a ⅛-in. hole was drilled. Shut-off valves on these nozzles controlled the flow of air. These nozzles worked very satis-

As each section was cleaned a mop coat of asphalt was applied

Relaying the track, using new ties on 4 in. of new stone ballast

factorily, not only in removing the dirt from the uneven surface, but they also tended to dry up any moisture. Where any remaining moisture was evident, two Aereol burners were used to dry it up.

Rebuild Tracks

As the eastward track was cleaned, old ties were laid along the inside ends of the ties on the westward track to prevent dirt and ballast from this track fouling the cleaned surface. When the work of cleaning the deck had progressed sufficiently, bridge gangs were ready to start applying the waterproofing. They had already set up two heating kettles on lorries at the east end of the bridge, and as each section was cleaned they applied a mop coat of Imperial 140-F.S.P. oxidized asphalt to the deck. As soon as this work had progressed sufficiently, the Burro crane, working from the line track, was used to unload sufficient stone to provide for a depth of four inches under the ties, and the track was relaid, using all new ties.

As the work of cleaning off the deck and mopping it with bitumen progressed across the bridge, construction of the new track followed closely, which was surfaced up to approximately one inch below the final grade. After the eastward track was relaid to the west end of the bridge, it was tamped with Jackson electric tie tampers and brought up to final grade.

After the guard rails were replaced in the eastward track, this track was put in service and the westward track was taken out of service. Work on the westward track was started at the east end of the bridge and, working westward, following the same procedure used on the eastward track. Extreme care was used in removing the old ballast from the westward track to prevent fouling the new ballast in the eastward track. When the westward track had been replaced, it was brought up to grade, tamped with Jackson electric tie tampers and restored to service.

Following these steps the eastward track was air tamped and brought back to final grade, as it was found that it had settled approximately one-half to three-quarters of an inch under traffic. The track was then carefully lined and the stone ballast was formed to a point two inches below the proposed finished grade of the final asphalt paving to be applied. This was accomplished by means of the templates that were furnished for subsequently forming the finished top of the paving—the stone ballast being shaped to a point two inches below the template.

Compacting the asphalt with air tampers. The finished top was formed by templates

Pave Top of Ballast Section

The asphalt paving material was then unloaded by the Burro crane in the six-foot. This material, which was supplied by Hagersville Asphalt Paving Limited, consisted of 60 per cent ¼-in. material and 40 per cent from ⅛-in. to 200 mesh, to which, per ton, was added 10 Imperial gallons of 91-100 penetration asphalt, and 3 Imperial gallons of Diesel fuel oil as a cut back. This material was readily handled by shovels and was spread over the stone ballast to a depth of one inch above the finished top of the paving. It was then readily compacted to grade, providing a 2-in. surface over the stone ballast. The grade on the paved surface was constructed to drain water from the center between tracks to gutters at the outer ends of the ties, through which it is carried to the down pipes.

After the eastward track was paved, the westward track was air tamped and paved in a similar manner.

Special hand tamping tools were made for compacting the asphalt, as well as tamping tools made from old air tamping bits for use in the air tamping guns. The tamping bits used in the air guns had variously shaped plates welded to their tamping ends and worked very successfully after some of the weaknesses in the welding of the plates to the bits were overcome. Without the air tampers, it was very difficult to compact the asphalt under the running rails, as the top of the paving was only one inch below the top of the tie on the inside end and two inches below the top tie at the outside end.

Extreme care had to be used in the finishing of the surface of the asphalt paving to maintain a grade to the gutters. Also, care was required in grading the gutters to the various down pipes, as the available fall at any point was slight. The guard rails were removed and replaced as the paving progressed, since the paving was all done under traffic.

Spray With Asphalt

After the paving was completed, the paving, ties, guard rails, and running rails were given a spray coat of H.R.M. bitumen, with a coating of sand applied to the ties and paved surface. The sand was a fine, sharp lake sand, the same as used in grouting soft spots in the roadbed. This was applied immediately after the spray coat was applied, and was brushed in since this tended to hold the bitumen from draining toward the gutters.

The spraying on the entire bridge was carried out in one operation, working from east to west. For this work a motor car was used to haul a drop-frame lorry, on which was mounted a Chausse maintenance kettle, complete with power spray with R.B. 6 engine. The motor car also hauled a lorry carrying sand.

Before the spray coat was applied, the entire surface to be sprayed was cleaned and air blasted to remove any cinders, dirt, etc., so as to have a thoroughly clean surface. Compression rail anchors were applied, two to a tie—excepting joint ties—alternately inside and outside the rail.

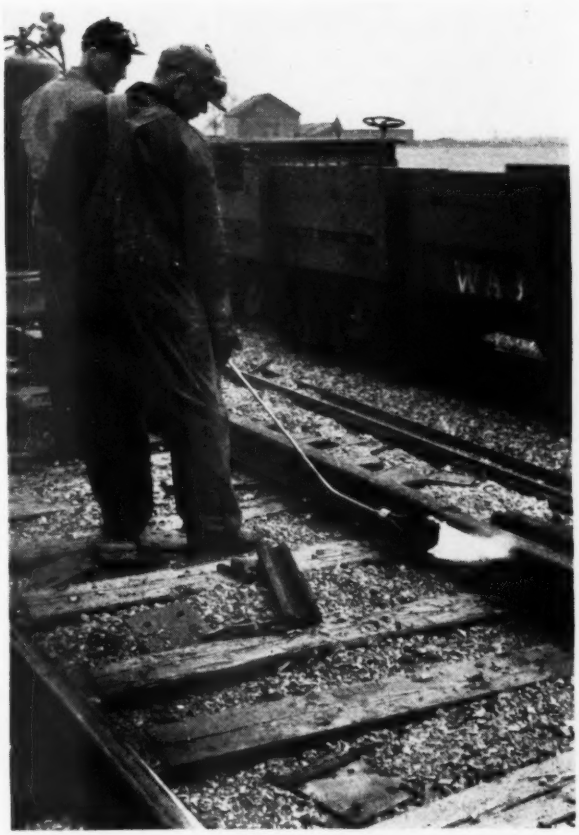
Flame cleaning of rail ends within joint bar areas is carried out just behind the rail-laying crane

Flame Cleans Rails to Prevent "Freezing" of Joint Bars

By U. F. PORTELL
Railroad Service Representative
Air Reduction Sales Company

A MID-WESTERN railroad is effectively using an oxy-acetylene flame-cleaning process to prevent the "freezing" of joint bars to rail ends of both new and relay rails. In this operation, which is carried out just behind the rail-laying crane, the ends of the rails within the areas of the joint bars are flame cleaned with an oxy-acetylene torch equipped with a specially-designed Airco tip, thoroughly removing mill scale, rust and moisture from the metal.

After applying the flame the rails are wire brushed and then oiled with a special preservative while the metal is still warm. The joint bars are then applied and bolted into place. The operation is easily accomplished and economically feasible. One torch operator and helper can flame clean 280 joints in an eight-hour work day at a cost of approximately $0.16 per joint.



Above—Operator removing mill scale from rail ends within the joint-bar area, using a flame-cleaning torch equipped with a specially-designed tip. Left—The appearance of rail ends after flame cleaning and then oiling with a special preservative prior to applying the angle bars. Prevention of "freezing" is the object

General view of the Reading's coach yard at Philadelphia, showing the arrangement of the platforms serving the service tracks

Reading Provides Better Coach-

This article describes the recent improvements made by the Reading at its terminal coach yard in Philadelphia, Pa., which were carried out primarily to bring the facilities for coach-watering into comformity with Public Health Service requirements. Features of the work include flush-type hydrant boxes, recessed into inter track platforms, concrete pipe ducts for the supply line leading to the boxes, and an 18-in. Ric-Wil asphalt-filled conduit for the main supply lines.

THE READING has recently completed a program of improvements at its Huntingdon Street coach yard, Philadelphia, Pa., which was carried out primarily to bring the facilities for supplying drinking water to coaches into conformity with the revised interstate quarantine regulations of the United States Public Health Service. In this project the coach-watering hydrants were enclosed within "pollution-proof" hydrant boxes, of the so-called flush type. New cement platforms were constructed between nine adjacent tracks in the yard and the hydrant boxes were arranged along the alternate platforms. The supply lines which serve the hydrants are carried in concrete ducts located directly beneath the platforms on which the hydrants are located. Another important feature of the project is the use of an 18-in. Ric-Wil fabricated, asphalt-filled pipe conduit to carry the main water supply line, as well as steam and air lines, transversely beneath all of the tracks in the coach yard.

Arrangement of Yard

Huntingdon Street yard lies in a generally north-south direction on a grade of one per cent descending southward. The yard is bounded on the north and east by public streets and on the west by the Reading's main line. The tracks are stubbed at the north end of the yard. A company-owned power house is located on the west side of the yard, between it and the main tracks.

The yard contains 28 tracks, of which nine, located along the east side, are given over to the daily servicing of coaches, while the remainder are used as repair and storage tracks. Prior to the recent improvements, the spaces between the service tracks were unpaved and the facilities for supplying drinking water to coaches did not conform to the revised Sanitation Manual for Land and Air conveyances of the Federal Security Agency of the U. S. Public Health Service.

In planning the improvements the Reading sought to devise an economical means of complying with the requirements of the Public Health Service regarding coach drinking water. After considering several possibilities, it was decided to construct platforms in the inter-track spaces in the service yard and to install hydrants of the flush type, locating these in cast-aluminum water boxes which, in turn, are recessed into the concrete platforms.

The Water Boxes

The water boxes, in which the hydrants are located, are provided on alternate platforms, thus enabling each line of hydrants to serve two tracks. These boxes are 16 in. by 25 in. by 10 in. deep. Each box is supplied with a hinged, self-closing cover, the edges of which overlap the box and extend downward to prevent the entry of surface water, and each contains two water outlets with quick-type coup-

Looking down one of the service tracks. The left platform is equipped with hydrants

Watering Facilities

lings—one from a 1-in. line for coach watering and the other from a ¾-in. line for car washing.

Quick drainage of the boxes is insured by a 2-in. drain hole, in the bottom of each box, leading to the duct below, and by a 2-in. pipe side drain leading to the edge of the platform and gutter, which functions as an overflow if the bottom drain should become blocked. The flow line of the side drain is 2⅛ in. below the water connections, thus minimizing the possibility of the connections becoming contaminated. The boxes were designed and manufactured by the Huffman-Wolfe Company, Philadelphia, Pa.

Drinking water is delivered to the coaches by hose lines used solely for this purpose. Similarly, the hose lines for car washing are used alone for that work. These hoses are attached to the water outlets by Bowes quick-type hose couplings, made by the Cleveland Pneumatic Tool Company. Homestead two-way cocks are provided on each outlet, so located that water in the hydrants may be drained to the pipe ducts when the water supply is shut off. The use within the hydrant boxes of different-size connections for the drinking-water and car-washing hoses precludes the interchanging of the hoses. Furthermore, a special fitting for joining the drinking-water hoses to the water intakes of the coaches prevents an error when filling the water tanks on the cars.

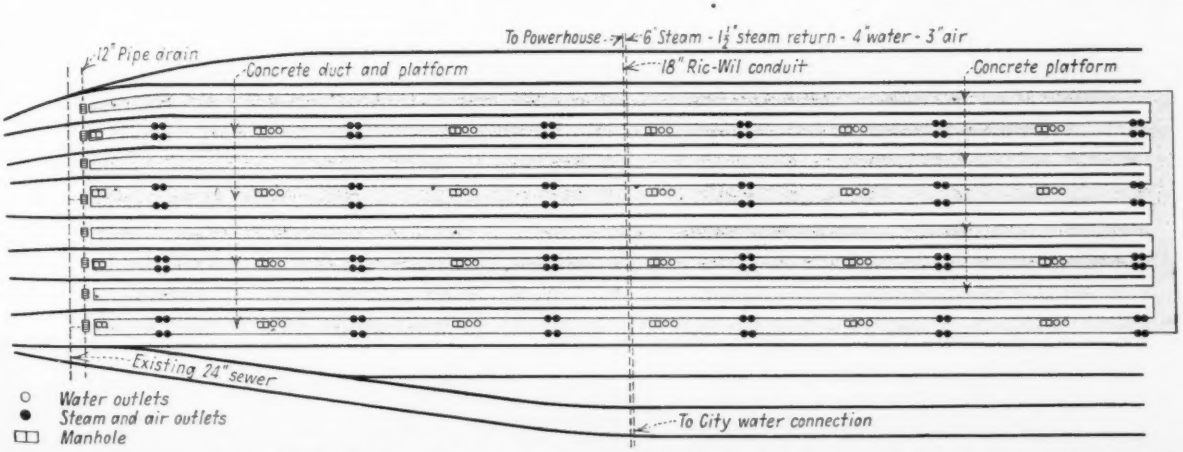
Ducts for Supply Lines

The new platforms are each 540 ft. long but, because of differences in the track centers, they vary in width from 4 ft. 3 in. to 9 ft. 3 in. An end platform, 9 ft. 6 in. wide, was constructed across the stubbed north ends of the service tracks to connect the longitudinal platforms. Outlets for steam and air are also provided on those platforms which contain the hydrant boxes.

The ducts, which extend the full length of the alternate platforms, have concrete-block side walls, concrete-slab bottoms and covers, and are 3 ft. by 3 ft. in inside section. The various water, steam and air lines in the ducts are carried on wall brackets. Water outlets are provided at 100-ft. intervals along the platforms, while the steam and air outlets are located on both sides of the platforms, midway between the water boxes. Manholes are provided immediately adjacent to the water outlets to facilitate inspections, cleaning and repair of the ducts.

To effect a more rapid disposal of surface water in this section of the yard the entire track area between the new platforms, except for the ties, was paved with bituminous material. The paving is crowned at the center line of each track and slopes to gutters at the sides. The gutters, in turn, slope with the grade of the tracks to a buried cross-drain at the south ends of the platforms.

As has already been noted, the main supply lines for steam, air and water



Plan of the Huntingdon Street coach yard, showing the new concrete platforms, the concrete ducts and the car-servicing facilities

Close-up view, showing one of the "pollution-proof," flush-type, cast-aluminum coach-watering hydrant boxes with the cover open

Welding two lengths of conduit together. Chain hoists and tripods were used to lower the assembled section into the trench

are carried in an 18-in. Ric-Wil buried conduit, which extends from the power house on the west side of the coach yard, beneath all of the tracks, to the street at the east side. Steam and air are supplied from the power house while water is supplied from a connection with a city main in the street.

The Ric-Wil Conduit

The Ric-Wil conduit is filled with asphalt and was delivered prefabricated in 20-ft. lengths, with the four pipe lines already in position, ready for installation. The individual pipes contained in each length of casing were welded together in the field, after which the casings themselves were joined by welding. Connections for the lateral lines in each duct were made in the shop and were so located that, as the Ric-Wil conduit was installed in the trench, each set of connections was situated at the proper spot.

The asphalt-filled conduit was chosen so as to prevent any contaminated surface water from coming in contact with the pipe line supplying the drinking water. It also permitted laying at a relatively shallow depth, because of its insulating characteristics, and affords protection against corrosion which makes the service life of a buried pipe relatively short.

Installing the Conduit

A total of 385 ft. of the conduit was required for the project. Installation was carried out in sections of 60 ft. each, the 20-ft. lengths being welded together while still above the track level. A suitable length of trench was prepared in advance of laying the sections of conduit. To permit this the tracks crossing over the trench were temporarily supported by means of "crutch rails".

When each section of trench was completed, the Ric-Wil pipe was lined into position on the rails directly above the point of installation. Then it was raised by means of chain hoists, supported from steel-pipe tripods, while the track rails were removed. With the rails out of the way, the pipe was lowered into the trench, after which the final connections between the sections were made by welding, the trench was backfilled, and the tracks were rebuilt over it.

The improvements at the Huntingdon Street coach yard were planned and carried out under the general direction of E. L. Gosnell, chief engineer of the Reading, and F. W. Biltz, assistant chief engineer. W. K. Wyatt, construction engineer of the Reading was in direct charge of the work.

Installs Continuous Rail in Track-Pan Area

THE New York Central System recently installed two lengths of continuous welded rail—one 3,401 ft. and the other 3,443 ft.—in the westbound main track at Painesville, Ohio, to eliminate rail joints throughout the length of a track pan. The two lengths were fabricated at the job site by the oxyacetylene pressure butt-welding method. Rail monuments were placed at each end of the long rails and at intermediate points to provide base points for checking the contraction and expansion. As shown in the above illustration, a Burro crane was used to set the long rails in place.

All Eyes Turn to Chicago

Holds much of interest for our readers during September, including two annual meetings of railroad maintenance men, a comprehensive exhibit of manufacturers' products, and the great Railroad Fair

Two Conventions

The principal attraction will be the concurrent annual conventions of the Roadmasters' and Maintenance of Way Association and the American Railway Bridge and Building Association, both to be held at the Stevens Hotel on September 20-22. These will embrace three days of committee reports and addresses on subjects of "bread and butter" interest to supervisory officers in the track and structures departments. All such officers, regardless of whether they are members of the associations, are invited to participate in these meetings. Detailed programs of the separate and joint sessions are given on the following pages.

Large Joint Exhibit

Those attending the conventions will be privileged to inspect an unusually large display of the latest machines, materials and devices offered for use in the construction and maintenance of railway tracks and structures. This will be a combined exhibit of the Track Supply Association and the Bridge and Building Supply Men's Association. On subsequent pages will be found a complete list of the exhibitors, including the products to be displayed and the names of the representatives who will be present. As an aid in locating particular exhibits a floor plan of the exhibit hall, with the booths numbered, is given along with the list.

Railroad Fair

Fifty acres of fascinating railroad and travel lore on Chicago's lake front await the pleasure of members and guests attending the two conventions. Railroad men viewing the individual and group presentations of railroads and manufacturers at the Fair cannot help but experience a thrill of pride in their industry. Like the general public, which has been jamming the Fair grounds in capacity numbers since the opening on July 20, railroaders will find much to educate, entertain—and surprise—them in this once-in-a-lifetime spectacle. As a service to our readers we present, on ensuing pages, a map of the Fair and pertinent information on the how, when and where of it.

Two Conventions—

Chicago Again Mecca for Track and B.&B. Men

J. S. Hancock
President,
American Railway Bridge and Building Association

Concurrent meetings at Hotel Stevens, September 20-22, will offer railway maintenance supervisors many interesting technical reports and addresses. Program allows ample time to inspect the products exhibit and visit the Railroad Fair

A. B. Chaney
President,
Roadmasters' and Maintenance of Way Association

FOR the third successive year, members of the Roadmasters' Association and the American Railway Bridge and Building Association will hold their annual conventions simultaneously and under one roof. As in the past, these meetings will be at the Hotel Stevens, Chicago, but this year the proceedings will start on Monday, September 20, rather than on Tuesday as has been the practice in the past. The sessions will be held in separate meeting rooms on the third floor of the hotel, but the opening session on Monday will be a joint meeting of both associations, and the two groups will meet together at other times during the convention to hear addresses on subjects of mutual interest or to participate in other functions.

The complete programs of the two conventions, including the joint sessions, appear on the opposite page. The reports of the technical committees—six for the Roadmasters and eight for the Bridge and Building group—will occupy the greater part of the calendar for each association. Interspersed with the reports will be several addresses on timely topics in the maintenance field.

The keynote of the meetings will be sounded at the joint opening session on Monday by J. H. Aydelott, vice-president, Operations and Maintenance department, Association of American Railroads. Following this session, the two groups will meet separately for the remainder of the day and on Tuesday morning. The second joint session will be Tuesday afternoon and will feature two addresses —one dealing with safety by O. H. Carpenter, general roadmaster, Union Pacific, Pocatello, Idaho, and the other with the supervisor's part in keeping down maintenance costs by A. E. Perlmen, general manager, Denver & Rio Grande Western, Denver, Colo. On Tuesday evening, the members of both associations, and their families, will be guests of the Track Supply Association and the Bridge and Building Supply Men's Association at an informal dinner and entertainment to be held in the hotel's Grand Ballroom.

Special features of the Roadmasters sessions will include addresses on Sand Methods of Stabilizing Roadbed by G. L. Sitton, assistant chief engineer, Southern, Washington, D.C.; on Rail Joint Bar Design, by G. M. Magee, research engineer, Engineering division, A.A.R.; and on Snow Fighting in Canada, by J. W. Risk, superintendent of work equipment, Canadian National, Toronto, Ont.

The Bridge and Building Association's program will feature two addresses and one motion picture. George M. Hunt, director, Forest Products Laboratory, Madison, Wis., will speak on Protection of Wood in Railway Bridges and Buildings, while Dr. Ruth D. Terzaghi will discuss the question: If the Railroads Are Not Securing Good Concrete—Why? The motion picture, entitled Mortar and Glass, will be presented through the courtesy of the American Structural Products Company—a subsidiary of the Owens-Illinois Glass Company.

A highlight of this year's convention will be a visit to the Railroad Fair on Chicago's lake front on Wednesday afternoon, September 22. This event will take the place of the inspection trip usually scheduled for the last day of the convention and will afford those visiting Chicago an opportunity to visit the Fair without missing any of the convention activities.

Sessions of the Roadmasters' Association will be presided over by the association's president, A. B. Chaney, assistant engineer maintenance of way, Missouri Pacific. The Bridge and Building Association meetings will be directed by its president, J. S. Hancock, bridge engineer, Detroit, Toledo & Ironton.

Programs

Concurrent Annual Conventions of the Roadmasters' and Maintenance of Way Association and the American Railway Bridge & Building Association

HOTEL STEVENS, CHICAGO, SEPTEMBER 20-22, 1948

(All Sessions Chicago Daylight Saving Time)

JOINT SESSIONS
MONDAY, September 20

*10:00 a.m.—Joint Conventions Called to Order.
*Welcome by presidents of the Roadmasters' and B. & B. Associations.
*10:05 a.m.—Greetings from the American Railway Engineering Association, C. H. Mottier, President.
Greetings from the Track Supply Association.
Greetings from the Bridge & Building Supply Men's Association.
*10:25 a.m.—Opening address by J. H. Aydelott, vice-pres., Operations and Maintenance department, Association of American Railroads.

ROADMASTERS' SESSIONS

11:00 a.m.—Address by President A. B. Chaney.
11:20 a.m.—Report of Committee on Use of Work Equipment at Derailments and in Coping with Other Emergencies—P. S. Settle, Chairman (trk. supvr. P.R.R., Perryville, Md.).

BRIDGE & BUILDING SESSIONS

11:00 a.m.—Address by President J. S. Hancock.
11:20 a.m.—Report of Committee on Good Housekeeping to Promote Safety and Fire Prevention—H. E. Skinner, Chairman (supt. scales & wk. equip., E.J.&E., Joliet, Ill.).

MONDAY AFTERNOON

2:00 p.m.—Award of Honorary Membership Certificates.
2:10 p.m.—Report of Committee on Modern Methods of Controlling Vegetation and Woody Plants—A. E. Botts, Chairman (asst. ch. engr., Maint., C. & O., Richmond, Va.).
2:40 p.m.—Address on Sand Methods of Stabilizing Roadbed, by G. L. Sitton, assistant chief engineer, Southern, Washington, D.C.
3:15 p.m.—Adjournment to Exhibit.

2:00 p.m.—Award of Honorary Membership Certificates.
2:10 p.m.—Report of Committee on Protection to Bridges Over Navigable Streams—A. E. Bechtelheimer, Chairman (br. engr., retired, C. & N.W., Winnetka, Ill.)
2:40 p.m.—Report of Committee on Types of Bridges for Replacing Timber Trestles—F. M. Misch, Chairman (gen. b.&b. supvr., S.P., San Francisco, Cal.).
3:10 p.m.—Report of Committee on Enlarging and Relining Tunnels for Present-Day Traffic—C. M. Eichenlaub, Chairman (res. eng., S.D.&A.E., San Diego, Cal.).
3:45 p.m.—Adjournment to Exhibit.

TUESDAY MORNING
September 21

9:30 a.m.—Report of Committee on Reducing Rail Joint Maintenance—R. R. Manion, Chairman (engr. m.w., G.N., St. Paul, Minn.).
10:20 a.m.—Address on Rail Joint Bar Design, by G. M. Magee, research engineer, Engineering division, A.A.R., Chicago
11:10 a.m.—Report of Committee on Functions and Responsibilities of Section Gangs—H. C. Fox, Chairman (div. engr., Southern, Greensboro, N.C.).

9:30 a.m.—Report of Committee on Housing Bridge and Building Employees—W. W. Caines, Chairman (asst. supvr. b.&b., C.&O., Huntington, W. Va.).
10:20 a.m.—Address on The Protection of Wood in Railway Bridges and Buildings, by George M. Hunt, director, Forest Products Laboratory, Forest Service, U.S. Dept. of Agriculture, Madison, Wis.
11:10 a.m.—Report of Committee on Recent Developments in Fuel Oil Storage and Servicing Facilities for Diesel and Oil-Burning Locomotives—H. E. Michael, Chairman (assoc. ed., Railway Engineering and Maintenance, Chicago).

TUESDAY AFTERNOON

*2:00 p.m.—Address on Safety Problems as Affected by Diesel Operation and the Increased Mechanization of Maintenance Work, by O. H. Carpenter, general roadmaster, Union Pacific, Pocatello, Idaho.
*2:30 p.m.—Address on How the Roadmaster and Bridge and Building Supervisor Can Help Hold Down Maintenance Costs, by A. E. Perlman, general manager, D.&R.G.W., Denver, Colo.

3:15 p.m.—Report of Committee on Educating Track Employees in the Cost of Materials, Tools and Equipment—E. L. Anderson, Chairman (asst. ch. engr., St.L.-S.F., Springfield, Mo.).
4:00 p.m.—Adjournment to Exhibit.

3:15 p.m.—Address on If the Railroads Are Not Securing Good Concrete—Why?, by Dr. Ruth D. Terzaghi, Winchester, Mass.
3:45 p.m.—Motion picture on "Mortar and Glass"—a production of the American Structural Products Company—a subsidiary of Owens-Illinois Glass Company.
4:00 p.m.—Adjournment to Exhibit.

TUESDAY EVENING
(Grand Ballroom—Informal)

*6:30—Joint Annual Banquet of the Roadmasters' and Bridge & Building Associations—With Supply Associations.

WEDNESDAY MORNING
September 22

9:30 a.m.—Report of Committee on Keeping Power and Spring Switches in Operation During Winter Storms—A. B. Hutson, Chairman (rdm., C.B.&Q., Galesburg, Ill.).
10:15 a.m.—Address on Snow Fighting in Canada, by J. W. Risk, superintendent of work equipment, Canadian National Railways, Toronto, Ont.
11:00 a.m.—Business Session.
Election of Officers.

9:30 a.m.—Report of Committee on Sanitary Facilities and Appurtenances for Railway Buildings—L. C. Winkelhaus, Chairman (arch. engr., C.&N.W., Chicago.).
10:15 a.m.—Report of Committee on Eliminating Waste of Water—E. R. Schlaf, Chairman (asst. supt. w.s., I.C., Chicago.).
11:00 a.m.—Business Session.
Election of Officers.

WEDNESDAY AFTERNOON

*Joint trip to the Railroad Fair on Chicago's lakefront, in recognition of "Roadmasters and Bridge & Building Supervisors' Day"—with an opportunity to see the historical pageant "Wheels A-Rolling."

*Joint Sessions.

Railroad Fair—

Big Show Adds Appeal to This Y

Fair Facts

Location—Between 20th and 30th streets along shore of Lake Michigan.

Admission Prices (tax included)—To grounds, 25 cents; to pageant, 60 cents; for ride on narrow-gage railroad, 10 cents; all other exhibits free.

Hours of Fair—10 a.m. to 10:30 p.m. daily.

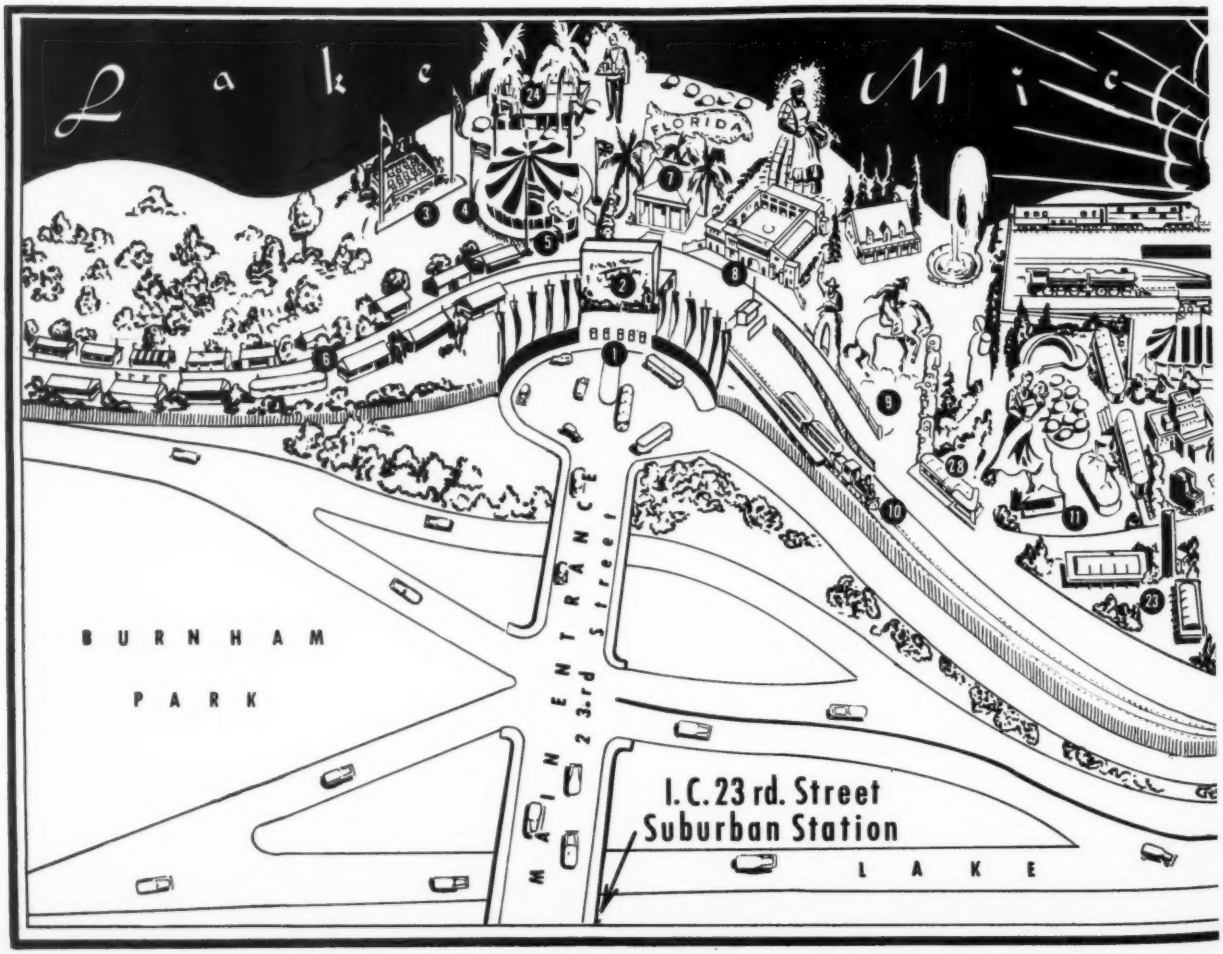
Schedule of Pageant Presentations—2 p.m., 4 p.m., 7 p.m. and 9 p.m.

Public Transportation to Grounds—BUSSES—Take special busses south-bound on Michigan avenue, which turn left at Balbo (north end of Stevens hotel). ILLINOIS CENTRAL—Board suburban trains from stations along Michigan avenue at Randolph, Van Buren or 12th streets. Detrain at 23rd street. SURFACE LINES—Any car line south from "loop" (except Dearborn) will intersect with 22nd Street line leading direct to Fair entrance.

THE Railroad Fair—sponsored by 38 roads and occasioned by the 100th anniversary of railroading in Chicago—offers the visitor—be he layman or railroader—an opportunity for many hours of pleasure and instruction. In its fifty acres of exhibits and displays one will find railroading on parade—from the strap-iron rails and wood-burning locomotives of its earliest days to the giant locomotives and deluxe trains of today.

The exhibits of the various roads, or groups of roads, include a reconstructed section of the famous French Quarter of New Orleans, a colonial mansion of the Old South, a western dude ranch chalet, complete with rodeo and a working model of "Old Faithful" geyser, and a replica of Chicago's first passenger station in which spectators may watch continuous entertaining features.

At other displays, the visitor may see a complete model railroad in an area 20 ft. by 50 ft.; he may visit an accurate replica of an Indian village from the Southwest and see the Indians carry on their normal daily activities; or he may see the actual golden spike which was used at the ceremonies marking the completion of the first transcontinental railroad.



Year's Meetings

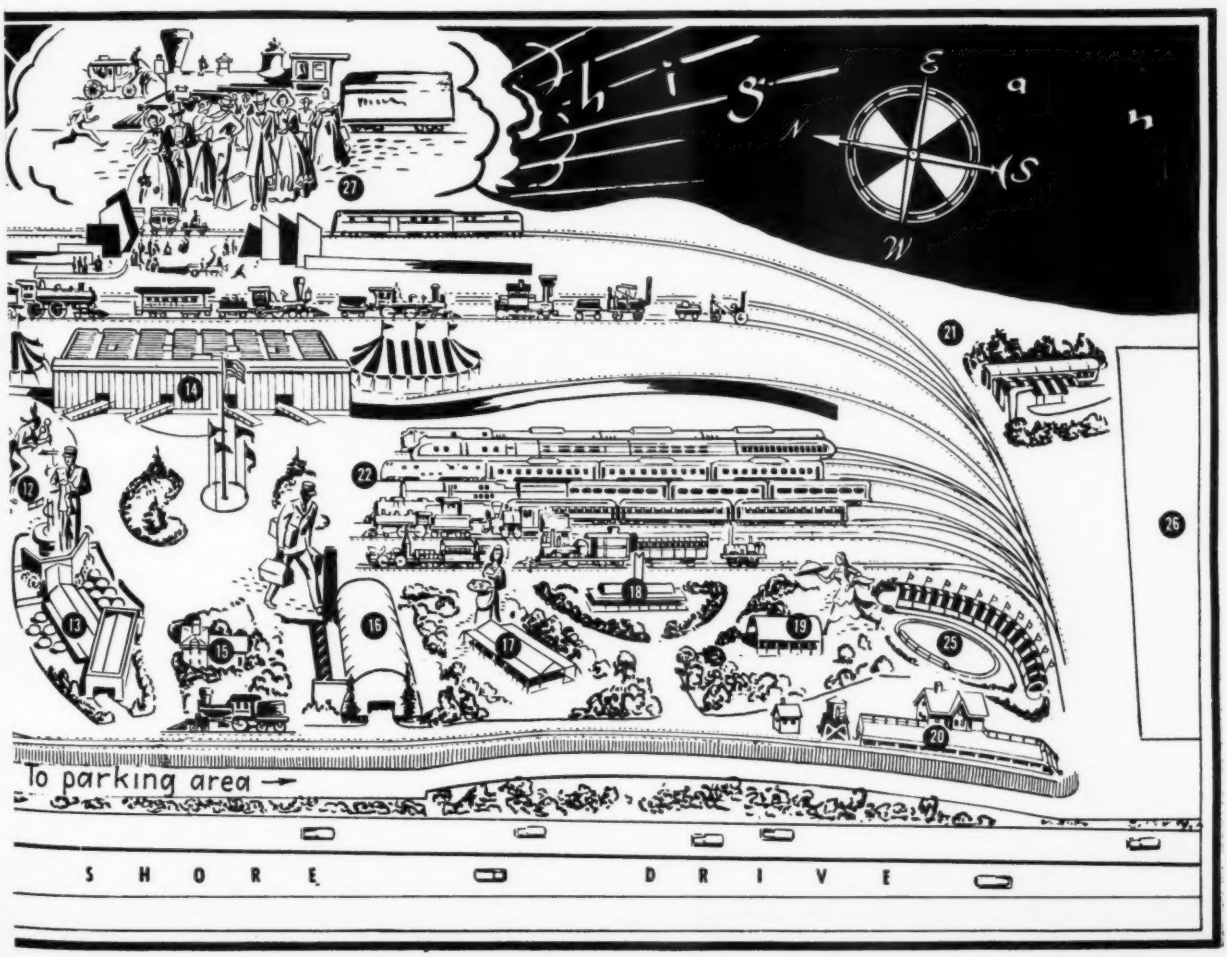
Probably the most outstanding spectacle at the Fair is the pageant "Wheels A-Rolling", which is presented four times daily. This is an out-door stage show that traces the history of rail transportation in America and does so in pantomime while two narrators relate the story. The action takes place on a 450-ft. stage and employs 220 actors, 70 horses and mules, and an array of ancient locomotives operating under their own power. It concludes with a spectacular finale in which modern steam and Diesel locomotives approach from opposite sides of the stage and meet in the center.

There are many other things to see and do at the Fair but space does not permit telling of them here. Among them are the exhibits of many railway supply companies; another is the "Deadwood Central"—a narrow-gage line, extending the entire length of the fair grounds.

Wednesday, September 22, has been designated as "Roadmasters' and Bridge and Building Supervisors' Day" at the Fair. The afternoon of that day has been left open by the convention program committee so that all may visit this "one-hundredth birthday party" of Chicago as a railway center.

Guide to Fair Map Below

(1) Main entrance. **(2)** Administration building. **(3)** Lakeside stage (for introduction of visiting dignitaries). **(4)** Plaza of Flags. **(5)** Heywood-Wakefield "merry-go-round" (now at another location). **(6)** Exhibits of railroad supply and service organizations. **(7)** "Florida in Chicago" exhibit of C. &E.I. **(8)** Illinois Central's street scene and patio representing the old French quarter of New Orleans. **(9)** Joint dude ranch and rodeo exhibit of the Burlington Lines, G.N. and N.P. **(10)** "Deadwood Central" station on narrow-gage railroad system. **(11)** Rock Island's "Rocket Village." **(12)** Santa Fe's Indian Village. **(13)** Eastern Railroad's exhibit. **(14)** Grandstand for "Wheels-A-Rolling" pageant. **(15)** North Western's reproduction of Chicago's first railroad station. **(16)** Pullman Company display. **(17)** Central restaurant. **(18)** Timken Roller Bearing exhibit. **(19)** South restaurant. **(20)** "Central City," reproduction of "Old West" station on narrow-gage railroad. **(21)** Budd Company's exhibit. **(22)** General track exhibits. **(23)** Pullman-Standard Car Manufacturing Company's exhibit. **(24)** Harbor View restaurant. **(25)** Union Pacific's western travel presentation. **(26)** Parking lot. **(27)** Pageant stage. **(28)** Rio Grande's exhibit. Another restaurant, designed to seat over 800 persons and to serve 40 meals a minute, is located near the 23rd St. entrance.

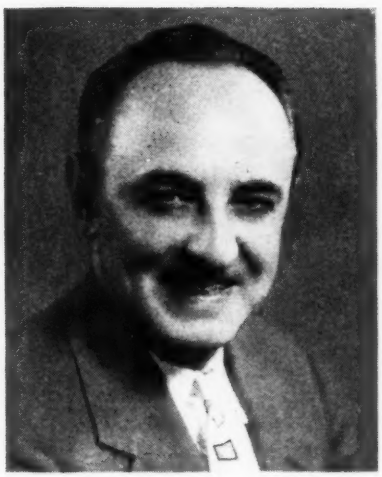


Large Joint Exhibit—

Extensive Display by Two Supply A

Howard Mull
President, Bridge and Building Supply Men's Association

J. B. Templeton
President, Track Supply Association



E. C. Gunther
Secretary, Bridge and Building Supply Men's Association

DURING the Roadmasters' and Bridge and Building conventions in the Hotel Stevens, Chicago, a comprehensive joint exhibit of manufacturers' products will be staged in the hotel's exhibit hall by the Track Supply Association and the Bridge and Building Supply Men's Association. General direction of the exhibit is in the hands of J. B. Templeton, president, and Lewis Thomas, secretary, of the Track Supply Association; and Howard Mull, president, and E. C. Gunther, secretary of the Bridge and Building Supply Men's Association. Mr. Thomas is serving as director of exhibits. A list of the companies participating in the event, with their booth numbers, the products to be displayed and the representatives who expect to be on hand, is presented here, together with a floor plan showing the exhibit spaces.

List of Exhibitors

Achuff Railway Supply Company, St. Louis, Mo.—rail anchor, spring washer, rail and flange lubricator, tie-saver trackpad; G. W. Achuff, H. G. Rowe, A. M. Wells; **Space 158.**

Air-Reduction Sales Company, New York—Welding equipment, welding and cutting torches, cutting machine, portable rail-cropping machine, cylinders of welding and rare gases; C. A. Daley, W. T. Love, L. C. McDowell, D. Moerke, W. P. Rogers, O. J. Williams; **Space 90.**

American Brake Shoe Company, Ramapo Ajax Division, Chicago—rail lubricator, switch stands, adjustable rail braces; R. A. Burt, G. A. Carlson, C. P. Corrigan, E. E. Daily, C. E. Godfrey, T. F. Going, H. Haselton, Jr., A. F. Hess, D. F. Hilton, J. V. Houston, A. F. Huber, J. S. Hutchins, W. P. Janicki, G. F. Killmer, J. P. Kleinkort, R. W. Payne, O. F. Magnus, L. I. Martin, W. A. Maxwell, R. L. McAbee, James McComb, W. C. Muller, E. F. Needham, H. W. Renick; **Space 91-92.**

The American Fork & Hoe Co., Cleveland, Ohio—rail anchors, tapered rail-joint shims, safety rail fork; C. C. Connolly, J. J. Nolan, D. L. O'Brien, Frank J. Reagan, Robert Simpson, John Skeel, R. J. Whalen; **Space 121.**

American Lumber & Treating Co., Chicago—pressure-treated lumber for bridge and building construction; flame-proof lumber; H. W. Angell, R. R. Clegg, John McCall, R. B. Putman; **Space 122.**

American Structural Products Company; subsidiary of Owens-Illinois Glass Company, Toledo, Ohio—glass block, roof tile, high-temperature insulating block, pipe covering; H. A. Bittner, H. C. Fowler, R. T. Whalen; **Space 23-24.**

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Multiplate pipe, tunnel-liner plate, sheeting, perforated pipe, asbestos-bonded pipe, spiral-welded pipe piling, steel building; C. H. Anderson, G. R. Betts, H. S. Claybaugh, E. T. Cross; J. D. Faylor, W. H. Spindler, Felix Truss; **Space A.**

Austin-Western Company, Aurora, Ill.—air-operated working model of 30-yd. drop-door automatic dump car, photographs; Jess Mossgrove, George Sines; **Space 113.**

Barco Manufacturing Co., Chicago—tie tampers, portable drillers, gas hammers, spike drivers, joints; F. N. Bard, W. J. Behlke, C. O. Jenista, W. T. Jones, C. L. Mellor, W. B. Miller; **Space 88.**

Bernuth Lembcke Company, Inc., New York—models of elastic rail spikes, tie-plate anchor spike, clamp plate; Wm. A. Fisher, A. C. Jack, B. Kuckuck; **Space 123.**

The Buda Company, Harvey, Ill.—track and bridge jacks, motor-generator set, small platform tractor, earth drill in operation (in parking lot south of hotel); J. W. Beity, E. S. Broholm, C. R. Burke, H. H. Cohenour, R. B. Fisher, R. R. Mangan, R. S. Mulroney, D. Richards, J. W. Sanford, C. W. Smith, R. P. Williamson, H. A. Wolfe; **Space 61-62-63.**

Caterpillar Tractor Company, Peoria, Ill.—interchangeable-parts display, cut-a-way display, sonovision and literature rack; Wm. Bohner, Larry Dougherty, Bill Grau, R. F. Hagerty, W. H. Hogan, C. Holmes, Ralph Patten, F. E. Schaumburg; **Space 35-36.**

Chain Belt Company, Milwaukee—W. B. Marshall, R. T. Sherrod, Austin K. Thomas; **Space 25-26-27-28-29.**

Chicago Pneumatic Tool Company, New York—pneumatic tools, electric tools, gasoline tie tamper, air compressors; J. J. Brown, C. L. Butler, S. A. Congdon, H. R. Deubel, J. E. Hopping, W. Pallowick, E. S. Rosselle; **Space 41.**

Chipman Chemical Company, Inc., Bound Brook, N.J.—de-icing and weed-killing compounds; R. B. Coleman, M. DeConink, A. Grdinic, R. Keeler, C. S. Langdon, N. J. Leavitt, W. H. Moyer, J. G. Murawski, A. J. Reading; **Space 131-132.**

Crerar, Adams & Co., Chicago—track and bonding drilling machines, track tools, fire extinguishers; R. W. Besant, T. J. Connely, Geo. W. Doyle, Chas. Grentz, O. C. Liesendahl, H. C. White; **Space 77.**

Cullen-Friestedt Company, Chicago—motion pictures of cranes and rail tongs; W. C. Bamber, L. B. Bertaux, C. J. Bronez, E. V. Cullen, F. P. Cullen, C. G. Edwards, T. G. Frazee, K. J. Huybers, Jos. F. Leonard, D. L. O'Brien, C. G. Prest, W. J. Roehl, Geo. Rumble, J. E. Simkins; **Space 80.**

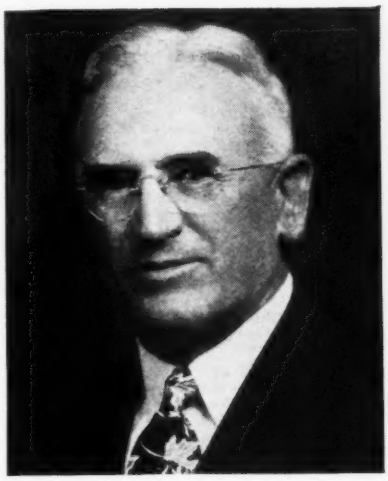
Dearborn Chemical Company, Chicago—rust preventive, wrapper for pipe protection, sealing compound for wood water tanks; D. B. Bishop, H. E. Johnston, F. H. Kuhlmann, D. D. Powers, C. C. Rausch; **Space 149-150.**

The Duff-Norton Manufacturing Co., Pittsburgh, Pa.—track jacks, ball-bearing screw jacks, hydraulic jacks, journal jacks, automatic lowering jacks; W. I. Floyd, E. C. Gunther, T. C. Hammer, T. W. Krueger; **Space 109.**

Electric Tamper & Equipment Co., Ludington, Mich.—electric vibratory tampers, power plant and accessories, motion pictures of tamping machine in operation; H. W. Cutshall, A. W. Davis, Adrian del Paso, Jr., Chas. Derler, G. L. Glover, M. D. Hall, G. H. Haywood, J. F. Hensel, R. F. Hermann, A. B. Holt, C. Jackson, Wm. B. Joyce, Chas. Leedham, J. T. Lydon, Warren Meyers, G. L. Morris, L. S. Osborn, H. D. Piper, J. W. Prewitt, J. M. Webb, M. S. Westlund; **Space 142-143-144.**

Fabreeka Products Co., Inc., Boston, Mass.—vibration and shock-absorbing pads for the re-

Associations



Lewis Thomas
Secretary, Track Supply Association

duction of mechanical wear of ties; A. E. Bardwell, Wm. P. Brennan, F. A. Hofmann, R. R. Howard, G. H. Marston, S. S. Maurer, Wm. B. Rogers, Jr., F. B. Summers, Jr.; **Space 38.**

Fairbanks, Morse & Co., Chicago—motor car, engine generator, portable electric lanterns, demountable hub wheels; O. E. Brauer, E. P. Chase, E. C. Golladay, R. F. Lane, J. F. Marquitz, C. B. O'Neil, C. A. Rauch, W. H. Turner, N. A. Sproesser; **Space 145-146.**

Fairmont Railway Motors, Inc., Fairmont, Minn.—Oil-spray car, inspection car, section car, highway-railway motor car; G. F. Adams, O. F. Banke, C. P. Benning, C. W. Brhel, W. D. Brooks, K. K. Cavins, C. J. Dammann, D. E. Doolittle, C. H. Johnson, F. W. Kasper, W. F. Kasper, F. A. Kaup, C. L. Reager, W. H. Ripken, F. E. Rose, H. A. Sly, R. W. Stenzel, W. M. Williamson; **Space 66-67-68-85-86-87.**

G. H. Rail Controls Inc., Kansas City, Mo.—rail anchor; Charles A. Earnest, W. C. Glover, Sr., C. J. Hunnicutt; **Space 64.**

Gravely Ia.-Nois, Inc., Davenport, Iowa—utility tractor; L.L. Delano, C. E. Grove, H. W. Klein, G. J. Wohlers; **Space 15.**

Hayes Track Appliance Company, Richmond, Ind.—derails and stands, wheel stops, photographs of bumping posts; Brice E. Hayes, Sidney P. Hayes, Herbert J. Mayer, Paul C. McClure; **Space 52.**

W. F. Hebard Company, Chicago—off-track, self-contained grouting machine; J. W. Cannon, R. M. Dickinson, W. A. Hensel, R. L. Palmer, E. L. Virden, Jr.; **Space 65.**

Homelite Corporation, Port Chester, N.Y.—portable self-priming pumps, electric generators and blowers, all gasoline-engine driven, high-cycle electric chain saws and high electric demolition hammer; P. R. Corbett, T. W. Gramm, Ed. Keegan, Leon Niemic, Robert Straetz, Nelson Thompson; **Space 47-48.**

Hubbard & Company, Unit Rail Anchor Co., Inc., Pittsburgh, Pa.—photographs; A. L. Fridley, J. H. Hines, N. A. Howell, A. C. Laessig; **Space 102.**

Illinois Malleable Iron Company, Chicago—rail anchors; Albert Erickson, Chas. G. Erickson, Dayton T. Hogg, Eugene C. Mann, Lloyd O. Stratton; **Space 112.**

Independent Pneumatic Tool Company, Aurora, Ill.—pneumatic and electric drills, grinders, nut runners, hammers, paving breakers, rock drills, saws, impact wrenches; J. F. Corkery, D. Gibbons, J. A. Hill, B. H. Johns, W. A. Nugent, D. E. Randall, R. Schafer, F. J. Schiel, C. B. Sexton, Mark Sorensen, R. A. Sward, George Thoma; **Space 136.**

Ingersoll-Rand Company, New York—portable air compressor, spot-tamper compressor, low-air-consumption tie tampers, lightweight spike driver, heavy spike driver, various pneumatic track tools, demonstration showing operation of electric impact wrenches; H. L. Kent, R. C. Baldwin, E. L. Hawes, T. W. Wiegand; **Space 119-120.**

Johns-Manville Sales Corp., New York—samples, pictorial display of corrugated-asbestos shingles, transite pipe, asbestos roofs, transite smoke jacks; C. E. Bryant Jr., Fred Fix, W. P. Gibbons, J. M. Landis, W. G. Morehead, R. J. Offutt, T. O'Leary Jr., C. M. Patten, A. C. Pickett, W. W. Prosser, P. E. Redding, F. C. Vandervort; **Space 107-108.**

O. F. Jordan Company, East Chicago, Ind.—¾ scale, fully operating model of spreader-ditcher, photographs; J. P. Bowers, J. J. Dee, L. J. Emmerling, J. C. Forbes, W. B. Joyce, H. M. McFarlane, W. J. Riley, Wm. Riley, C. W. Shipley; **Space 95.**

Joyce-Cridland Company, Dayton, Ohio—automatic lowering jacks, track jacks, bridge jacks, journal jacks, air-operated jacks; Houston Brown, C. N. Thulin; **Space 44.**

Kalamazoo Manufacturing Company, Kalamazoo, Mich.—Motor engine, transmission, motor car with generator, electric drill, electric saw, floodlights, electric nut runners, track wheels, track gage, track level, R. E. Keller; **Space 125-126.**

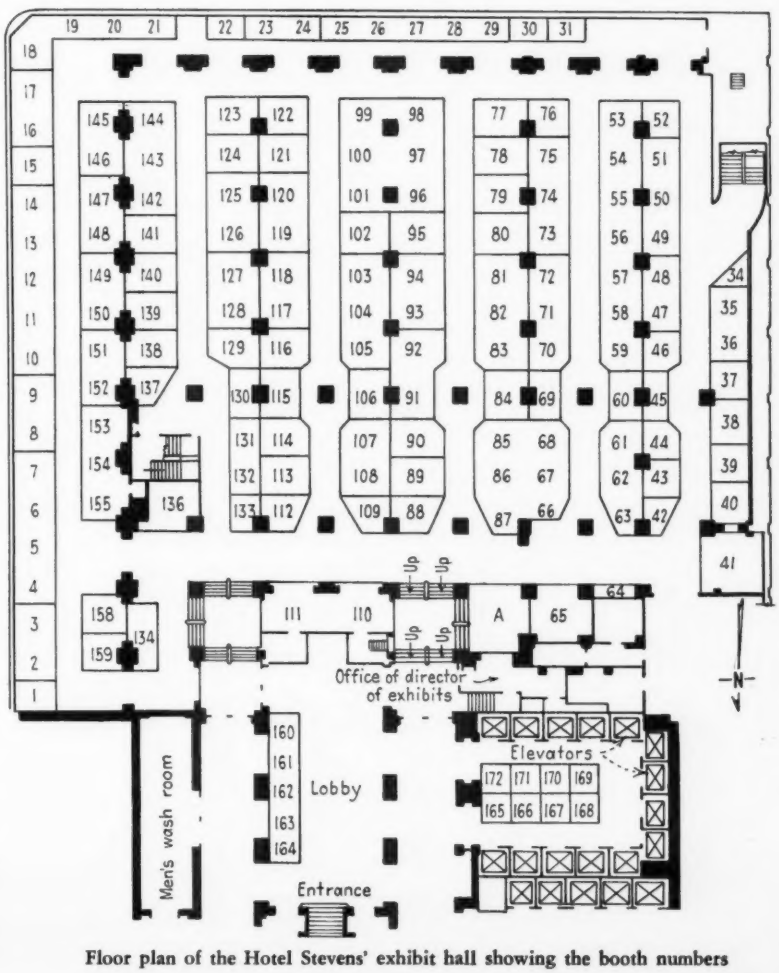
The Kershaw Company, Inc., Montgomery, Ala.—Single-wheel cribber, multi-wheel cribber, auger-type cribber, rail derrick, spike-setter carriage, ballast shaper, regulator and track dresser; R. E. Bell, John P. Crow, Jeff W. Davis, Otis B. Duncan, W. D. Hoffman, Royce Kershaw, Joseph F. Leonard, H. H. Williams; **Space 18-19-20-21.**

Koehring Company, Milwaukee, Wis.—photographs of crane car, crawler crane; E. J. Goes, H. J. Holdsworthy, A. E. Kalbe, John Poolter, J. F. Robbins, R. E. Stewart; **Space 84.**

Koppers Company, Inc., Pittsburgh, Pa.—fire-retardant, pressure-treated wood, pressure-treated wood in the railroad field, samples of pressure-treated wood for various treatments; W. P. Arnold, H. F. Egan, M. A. Hamrick, E. J. McGehee, C. E. Masini, A. R. Nickel, G. C. Rosenquist; **Space 10.**

The Lehon Company, Chicago—smooth and slate-surfaced asphalt roll roofing and shingles, cold-process roofs, waterproof felts, papers and fabrics, asphalt roof coatings, paints and cements, asphalt built-up roofs, waterproofing fabrics, felt and asphalts for bridge waterproofings; T. L. Connolly, C. E. Croisant, J. E. Eipper, Tom Lehon, A. C. Senseney, John W. Shoop; **Space 40.**

Le Roi Company, Chicago—tractor-mounted compressor equipped with swing loader and utility boom with earth auger, right-of-way mower, gasoline engine, tie tamper and other air tools; R. E. Bell, R. H. Bell, Jos. H. Callahan, G. M. Dallas, R. M. Darr, J. G. Dean, J. M. Dolan, Jas. T. Flynn, K. E. Gifford, J. E. Heuser, D. J. Hogan, G. M. Hogan, J. E. Hogan, G. C. Hunt, L. E. Hunt, E. A. Longenecker, R. R. Morgan, D. L. O'Brien, J. J. O'Brien, R. E. Schatmeyer, Stanley H. Smith, L. O. Stratton, R. N. Weber; **Space 4-5-6-7.**



Floor plan of the Hotel Stevens' exhibit hall showing the booth numbers

Link-Belt speeder Corporation, Cedar Rapids, Iowa—motion pictures and color photographs of shovel, cranes and draglines in operation; R. B. Barnes, J. W. Bruno, B. V. Jones; **Space 140.**

The Lundie Engineering Corporation, New York—tie plates, rail lubricators, tie tongs, L. B. Armstrong, J. P. Armstrong, W. B. Joyce, Charles Stone; **Space 130.**

Mack Welding Company, Duluth, Minn.—safety hand tongs; Charles McElderry, M. M. McElderry, Wm. R. McElderry; **Space 31.**

Maintenance Equipment Company, Chicago—improved rail and flange lubricator, switch-point protector, blue-flag derail, photos of power rail layer and set-off; E. Overmier, T. E. Rodman, H. V. West Jr., P. J. Wolfe; **Space 114.**

Mall Tool Company, Chicago—rail grinders and attachments, chain saws, vibrators and surfacers, portable electric hand saws and drills; Earl Bettis, A. W. Mall, R. W. Proctor, Ralph Schwass, Don Soderberg; **Space 127-128.**

Marvel Equipment Company, Chicago—track liners, electric, oil, gas and propane switch heaters, mowers, snow plows; W. A. Blackford, T. C. Coleman, Jack B. Gould, Blake Howard, Fred Jorgensen, O. E. Quinton, J. N. Thorp; **Space 141.**

Massey Concrete Products Company—Chicago—catalogs and photographs of concrete culvert pipe, piling, cribbing, bridge slabs, battery boxes, relay houses; Ross Clarke, W. Lyle McDaniel; **Space 60.**

The Master Builders Company, Cleveland, Ohio—treatments for concrete and mortar; V. S. Andrews, C. H. Borcherding, D. Burkhardt, J. Fellabaum, A. S. Holway, W. Jaros, C. A. Lyon, E. W. Scripture, B. R. Wood; **Space 13-14.**

Meskimen Power Sickle Mower Company, Chicago—power mower, snow-blade and rail-joint oiler attachment; L. C. Meskimen, M. Peterson; **Space 12.**

Mid-west Forging & Mfg. Co., Chicago—rail anchor; Noble Gibson, J. L. Hench, Ray T. Johnson, Russell Robertson, James R. Wilson; **Space 46.**

Mine Safety Appliances Company, Pittsburgh, Pa.—powder-actuated driver, rail punch, portable punch, cable splicer; W. S. McConnell, R. C. Temple; **Space 159.**

Mississippi Supply Company, Chicago—W. S. Gilpin; **Space 11.**

Modern Railroads Publishing Company, Chicago—Copies of publication; L. R. Gurley, W. R. McIntyre, Paul Jackson, Frank Richter, D. R. Watson; **Space 42.**

Morrison Railway Supply Corporation, Buffalo, N.Y.—adjustable rail holders, track stabilizers, switch point guards; Geo. J. Diver, Geo. W. Diver, John H. Dooling, E. L. Klopfer, M. L. Morrison, E. W. Smith, D. R. Vogel; **Space 43.**

Murdock Manufacturing & Supply Co., Cincinnati, Ohio—check valves, air valves, drinking fountains, water service fixtures, post-tvpe hydrant, railroad water service boxes, hydrants, street washers, Diesel watering boxes, railroad specialty items; C. F. Haas, E. Leroy, J. Kelso Murdock, Robt. J. Murdock, H. F. Oswald; **Space 106.**

Nordberg Manufacturing Company, Milwaukee, Wis.—rail drill, spike hammer gaging team, power wrench, lag-screw wrench, bolt-tension meter; Dave Anderson, A. W. Banton, W. B. Blix, L. B. Brassy, Geo. M. Cooper. Geo. M. Dallas, J. R. Graham, Stan H. Haigh, James F. Hartley, John E. Hogan, John L. Holman, Robert L. Holman, W. S. Isaacs, Clyde K. Jensch, Eugene Larson, Ralph W. Payne, Will H. Reaves, E. L. Ricketts, James W. Samson, Stanley H. Smith, Lloyd O. Straton, H. H. Talboys, L. D. Whitaker, W. Conroy Wilson; **Space 81-82-83.**

Northwestern Motor Company, Eau Claire, Wis.—heavy-duty extra gang car, bridge and building gang car, standard section motor car, light section motor car, one-man inspection car, rail and frog grinder; J. B. Akers, Jr., M. W. Allen, F. W. Anderson, E. J. Baker, W. F. Beven, O. B. Duncan, W. H. Haas, F. O. Jarver, W. B. Joyce, C. E. Murphy, J. C. Neimeyer, A. H. Nelson, G. G. Prest, W. J. Roehl; **Space 96-97-98-99-100-101.**

Oliver Iron & Steel Corporation, Pittsburgh, Pa.—track bolts, frog bolts, switch bolts, heel-block bolts, gage rods, screw spikes, drive spikes, nuts, timber grips, eye bolts, machine bolts, carriage bolts, lag screws, rivets, hook bolts, small forging; J. C. Cullinan, C. H. Reymer, Edward M. Welty, Carl Wingerson; **Space 137.**

D. W. Onan & Sons, Minneapolis, Minn.—gasoline-driven power units, self-contained, 2,500-watt, Diesel-driven power unit, engines; Perry Copeland, Hiram Hascall; **Space 76.**

Overhead Door Corporation, Hartford City, Ind.—working models of electrically-operated and manually-operated overhead doors; Robert E. Myers, Wm. B. Rosenbaum; **Space 16-17.**

The Oxweld Railroad Service Company, Chicago—rail pressure-welding machine, apparatus for flame-hardening railroad open-hearth frogs, photographs; Lem Adams, G. P. Bogert, Bob Boyle, M. Burnett, Jr., W. E. Campbell, S. P. Donegan, F. J. Duffie, H. V. Gigandet, F. J. Graham, E. B. Hall, Jr., F. C. Hasse, W. A. Hogan, P. Hunter, Jr., M. E. Keith, J. W. Lacey, P. T. McKinney, H. R. Miller, R. J. Nenneman, D. H. Pittman, J. H. Rodger, K. I. Thompson, R. W. Torbert, Steve Toth, J. E. Winslow; **Space 103-104-105.**

The P. & M. Co., Chicago—rail anchors; J. J. Gallagher, Wm. Garrity, Geo. E. Johnson, John E. Mahoney, J. J. Metzger, P. J. Moore, Jr., R. W. Payne, Max K. Ruppert, R. C. Schulze; **Space 139.**

Pettibone Mulliken Corporation, Chicago—cribbing machine and hoist, adjustable rail braces, mechanical switchman, automatic switch stands, rigid switch stands, stand for use with electric lock, hydraulic retarder for spring frogs, clamshell buckets, dragline buckets, portable gasoline hammer, shoulder bolts for switches and spring frogs, spring switch compression gage, manganese steel one-piece guard rails, adjustable tee-rail guard rails, rerailers, bucket loader with swivel-belt conveyor, portable conveyors, hopper bottom car unloader; J. H. Asselin, W. A. Blackford, W. F. Brietzke, W. A. Enstrom, L. Harlacker, E. L. Kelley, J. Mould, E. C. Phillips, G. J. Slibeck, E. H. Sockwell, K. Von Kampen, W. E. Weiss; **Space 53-54-55-56-57-58-59.**

The Pocket List of Railroad Officials, New York—copies of Pocket List; B. J. Wilson; **Space 133.**

Power Ballaster Division of Pullman-Standard Car Manufacturing Company, Chicago—working models of cribbing machine, ballast cleaner and tamping machine, motion pictures; John Benko, J. M. Dubois, C. B. Faverty, H. E. G. Mulligan, F. H. Philbrock, H. D. Richardson, Robert Sloan, J. J. Trout, Peter Young; **Space 160-161-162-163-164.**

The Q. & C. Co., New York—switch-point guard, guard-rail clamp, derails, compromise joints, adjustable rail brace, gaging tools, flangeway guard brackets, wheelstops, gage rods, anti-slip rail tongs, foot guards, electric snow melter; Paul Chynoweth, L. E. Hassman, M. Iseldyke, Jr., J. C. Niemeyer, G. G. Prest, S. W. Prest, W. L. Ricker, Lewis Thomas; **Space 116.**

Racine Tool & Machine Co., Racine, Wis.—unit tie tamper, power rail saw, power rail drill, bonding drill; G. W. Christiansen, E. R. Larson, H. A. Schultz; **Space 2-3.**

The Rail Joint Company, Inc., New York—Standard, insulated and compromise rail joints; W. J. Acker, V. C. Armstrong, Alex Chapman, G. M. Clodfelter, E. A. Condit, H. L. Emerson, R. W. J. Harris, H. C. Hickey, H. L. Lansing, G. H. Larson, J. N. Meade, T. I. Moore, R. W. Payne, Thomas Ryan, K. E. Sporre; **Space 89.**

Railroad Accessories Corporation, New York—Power track wrench; E. M. Deems, M. R. Waller; **Space 151-152.**

Railroad Equipment, New York—copies of publication; John C. Broderick, Maxwell A. Brown; **Space 34.**

Railroad Products Company, Cincinnati, Ohio—pollution-proof coach hydrants, Diesel water columns, switch stands; Otis B. Duncan, Dan J. Higgins, F. J. McDonough, Jas. W. McGarry, George G. Prest, Henry Vogel, Ben Wickemeier; **Space 134.**

The Rails Company, New Haven, Conn.—compression rail anchors, M. & L. track construction, automatic switch lock, bridge tie anchor, propane switch heaters, full-throated cut spike, screw spike; R. E. Bell, R. H. Bell, Lester T. Burwell, L. E. Flinn, F. W. Gale, F. W. Holstein, Milburn Moore, W. A. Peck, J. V. Wescott; **Space 78.**

Railway Engineering and Maintenance, Chicago—copies of publications; C. M. Burpee, M. H. Dick, R. E. Dove, W. G. Downie, N. V. Engman, S. W. Hickey, N. D. Howard, P. D. Juraschek, F. C. Koch, H. E. McCandless, H. H. Melville, C. W. Merriken, Jr., H. E. Michael, Geo. Murphy, F. W. Smith, W. L. Turner, Jr., J. S. Vreeland; **Space 115.**

Railway Maintenance Devices Company, Morton Grove, Ill.—tie puller-pusher, signal shunt, riding-walking track gage; Arthur Lange, C. L. J. Welch; **Space 37.**

Railway Purchases and Stores, Chicago—copies of publication; Edward Wray, J. P. Murphy, Jr., K. F. Sheeran; **Space 69.**

Railway Track-Work Company, Philadelphia, Pa.—rail-grinding equipment, rail drill; Wm. D. Hoffman, John B. Moore; **Space 153-154-155.**

Reade Manufacturing Company, Jersey City, N. J., Harrop Chemical Company, Chicago—railroad weed-killing chemicals and spray equipment, waterproofing compounds; D. M. DeWitt, T. Moore, C. A. Parish, C. F. Reade, C. H. Reade, L. J. Reade, J. E. Stalzle, W. L. Tanner; **Space 110-111.**

Roseman Tractor Equipment Co., Chicago—tractor, rotary-broom, sickle-mower and snow-plow attachments, front-end loader; William Beven, Otis Duncan, J. A. Roseman, Jr., W. J. Roseman; **Space 49-50-51.**

Rust-Oleum Corporation, Evanston, Ill.—photos of rust-preventive applications, other practical uses, demonstration table; R. B. Arnold, Waldo E. Bugbee, W. J. Church, W. R. Collins, R. A. Fergusson, W. W. Fetner, W. D. Jenkins, E. W. Kush, C. W. Mathews, C. E. Murphy, Frank B. Nugent, R. L. Nutt, Jos. C. Simmons, F. M. Sweeney, J. N. Thorp, F. O. Walsh, Jr.; **Space 39.**

Safety First Shoe Company, Holliston, Mass.—safety shoes; A. H. Crafts, J. E. Flegel; **Space 45.**

Sperry Products, Inc., Danbury, Conn.—literature on detector car service, model car, samples of rail defects; J. W. Dice, J. M. Dickey, W. K. Hooper, T. F. Kennedy, W. P. Morrison, H. F. Motz, S. P. Murphy, S. A. Thompson; **Space 8-9.**

Teleweld, Inc., Chicago—literature on service for railroads; H. E. Finley, O. R. Hansen, C. W. McKee, H. E. McKee, E. J. Payton, J. A. Roche; **Space 79.**

Templeton, Kenly & Co., Chicago—aluminum alloy track jack, ballasting, surfacing and lining jack, jack support, track jacks, rail expanders, tie spacers, track shifters, journal jacks, bridge jacks, center-hole hydraulic pullers, push-and-pull jacks; W. E. Gahl, R. B. Hill, F. W. Lamb, Chas. Miller, G. G. Prest, L. F. Roehl, W. Simpson, Alvin M. Smith, A. C. Templeton, J. B. Templeton; **Space 117-118.**

Thornley Railway Machine Company, Joliet, Ill.—cribbing machine; L. Hassee, F. L. McMillan, E. M. Thornley; **Space 22.**

Timber Engineering Company, Washington, D.C.—photographs, murals and models showing the use and application of various timber connectors; R. L. Fletcher, L. P. Keith, C. F. Martin; **Space 129.**

United Laboratories, Inc., Cleveland—exhibit of platform and floor-resurfacing materials, before and after photos, literature, floor-wear demonstrating machine; A. B. Humphrey, R. H. Mathews, Robert L. Meyer; **Space 138.**

Warren Tool Corporation, Chicago—claw bars, sledge hammers, track chisels, spike mauls, track tools; Howard Mull, Oscar W. Youngquist; **Space 124.**

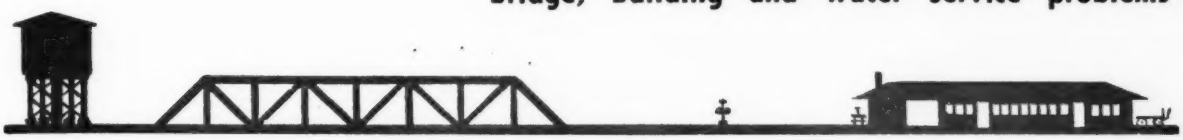
Woodings-Verona Tool Works, Woodings Forge & Tool Co., Chicago—rail anchor, fixed-tension spring, track tools; C. K. Luyster, R. J. McComb, G. L. McKewin, J. M. Moore, Geo. Snyder, W. H. Woodings; **Space 93-94.**

Woolery Machine Company, Minneapolis, Minn.—weed burners, tie cutter, flange-way cleaners, off-track joint oilers, tie plate spacers; R. J. Moe, L. E. Woolery, W. F. Woolery; **Space 70-71-72.**

Worthington Pump & Machinery Corp., Holyoke, Mass.—air compressor, pumps, grouting machine, air tools, mixers; J. S. Clinger, W. H. Duttill, W. J. Fleming, H. E. Gallison, Jack How, B. T. LaPierre, C. F. Oechsle, H. J. Schultz; **Space 73-74-75.**

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Desirability of Safety Shoes

To what extent is it desirable that those in the track forces wear safety shoes? Why? Should their use be made compulsory? If not, should their voluntary use be encouraged? If so, how?

Safety Shoes Desirable

By H. S. Ashley
Engineer of Track, Boston & Maine, Boston, Mass.

It is desirable that all track and bridge and building forces wear safety shoes, but their use should not be made compulsory. Voluntary use should be encouraged by discussing, at foremen and crew meetings, the details of accidents that have occurred, but which might have been prevented if safety shoes had been worn. The use of safety shoes can be further encouraged by stocking them at convenient points and permitting employees to pay for them by pay roll deductions.

By keeping this subject active and before the men at all times, the wearing of safety shoes will be encouraged and many foot injuries avoided.

Safety Shoes Save Toes

By L. J. Benson
Assistant to Vice-President, Chicago, Milwaukee, St. Paul & Pacific, Chicago

It is desirable to the fullest extent that track workers wear safety shoes. The very nature of the work done by the track forces makes it desirable that they have the steel-toe-box protection of safety shoes. It is desirable, too, that a safety shoe of sturdy construction be used by trackmen. Working in rough ballast, the safety shoe soles should be of a type which will withstand hard usage. A light-weight, single-leather-sole safety shoe should not be purchased and worn by trackmen, since this type of shoe will not stand up and give the kind of wear a trackman should expect.

It would be difficult to make the wearing of safety shoes compulsory. The program should be handled on the basis of encouraging workers to purchase and wear safety shoes on the job for the benefits which will accrue to them. This can be accomplished in various ways, but principally through activity on the part of the supervisors. Where safety shoes are stocked in railroad storerooms, samples of those types particularly adaptable for use in track work can be obtained from the storeroom by the roadmaster and, in traveling over his territory, he can show the samples to trackmen so that they may make their selections and sign the necessary purchase orders. Where shoe stocks are not available on the railroad, employees should be encouraged to make purchases of safety shoes from local shoe dealers. In carrying out the program it is usually quite effective to acquaint employees with certain case histories where toes or feet have been spared serious injury through the wearing of safety shoes.

Trackmen Need Safety Shoes

By W. L. Kelly
General Roadmaster and Safety Supervisor, Erie, Jersey City, N.J.

I do not know of any occasion where that old saying, "An ounce of prevention is worth a pound of cure," applies more appropriately than it does in regard to the question of wearing safety shoes in maintenance-of-way work. A review of our accident reports will show a large number

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 105 W. Adams St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In November Issue

1—When establishing elevations on the runoff of a curve, using string line notes, at what point should the full elevation be located—at the last station where the ordinate is less than the ordinates of the simple curve; at the station where the first full ordinate is obtained or at the second full ordinate? Explain.

2—Can new or in-service pipe lines be treated to prevent incrustation or the formation of tubercles? If so, how? What are the advantages?

3—Is it practicable to contract with local coal dealers for supplying the fuel needs of stations, office buildings, crossing watchmen's shanties, towers, etc.? Explain.

4—Where can finned-pipe radiators be used for heating shops, enginehouses, passenger stations and other buildings? Can they be combined effectively with other types of heating facilities? Explain.

5—Should some form of shelter be provided for the use of men assigned to keep outlying switches clear during winter storms? If so, under what conditions? What type is best adapted?

6—Of what importance is the loss of camber in a steel span? What does it indicate? Does it require investigation? Explain.

7—What factors determine the number and distribution of emergency rails kept on hand in single and double-track territory? Should a flexible or fixed policy be established in this regard? Why?

of foot or toe injuiries due to rails, ties or timbers slipping, rolling or falling on feet. Some of these accidents were serious because the men were not wearing safety shoes. Others were trivial, but could have been serious. Practically all of them might have been avoided if the injured persons had been wearing safety shoes. A hard and fast rule compelling men to wear safety shoes while at work would not be advisable, but every opportunity should be taken to encourage them to buy and wear such shoes. The fact should be pointed out that safety shoes can now be purchased in a wide range of styles and are in every way comparable to ordinary dress shoes.

Every foot injury should be discussed at safety meetings and where the injury might have been prevented by wearing safety shoes, this fact should be brought out.

There is no reasonable excuse why anyone whose work involves the handling of track material, with the hazards which this involves, should not wear safety shoes for his protection—especially since such shoes cost no more than ordinary shoes and look as well.

Value of Association Memberships

How important is it that each railroad be well represented by its supervisory officers in the activities of the American Railway Engineering Association, Roadmasters' Association and Bridge & Building Association? How can such representation best be encouraged?

Committee Work Beneficial

By H. R. Clarke*
Chief Engineer, Burlington Lines, Chicago

The associations referred to are all voluntary organizations of individuals. They are not sponsored or directed by the railroad industry, although the American Railway Engineering Association is a section of the Engineering division of the Association of American Railroads and the work of these latter associations is very closely related. The associations are further alike in that they have a common purpose which, generally stated, is to inform their members and others in regard to technical matters having to do with railroad location, construction, maintenance, and operation, to keep them advised as to changing conditions and informed in regard to practices and standards which are considered best and most desirable.

I know of no way in which a railroad officer can more easily and certainly keep himself advised in regard to questions which have an important bearing on the work he does and the decisions he makes than to belong to one or more of these technical organizations and take an active part in their work. This being so, it would seem that any railroad officer having to do with such matters, and particularly any engineering or maintenance officer who has the proper interest in his work, and who desires to equip himself to handle it more efficiently, would appreciate the opportunities offered by these associations. In my opinion, if he neglects to avail himself of the opportunities offered, he is either not interested in his work, or extremely shortsighted. However, as the three associations are voluntary organizations, the decision is one which each individual must make for himself.

The question as stated, however, would seem to suggest a reply, if possible, from the standpoint of the railroads, rather than the individual. In no case does a member of any of the associations directly represent the railroad for which he works. He, of course, is familiar with the problems, standards, and methods of his road and is, no doubt, influenced by these in information which he may furnish, or reports which he may help to write, and quite likely in ballots which he may cast. The recommendations, however, are not binding on any railroad, but can be used and applied as the responsible officers of each road think best. Therefore, the individual member may express his personal opinion freely.

If the associations fulfill their purpose, and if, by belonging to and working in them, an employee or officer of a railroad becomes more capable and efficient, he benefits thereby in that he has greater satisfaction in his work, and probably recognition of a substantial kind in the way of promotion and advancement will come in due time. The railroad which employs him benefits likewise in that more effective and efficient service is rendered. This I think justifies an affirmative answer to the question, and our saying that it is very important that a railroad be properly represented in the membership of the associations referred to.

The question of how this may be encouraged is perhaps more difficult to answer. Personally, I do not believe in the employing road paying anyone's dues in these associations. If the individual is not sufficiently interested to pay his own dues gladly, I fear he will profit very little; and unfortunately, there are some who will not profit much, if at all, by membership. I think that, perhaps, the best way in which memberships which are profitable — to the associations, the individuals and the railroads—can be encouraged is by the proper officers bringing the matter of membership to the attention of those who will, in their opinion, profit by membership, and who as members will be of some value to the association, other than merely through the payment of dues.

It is important that no pressure be exerted. The advantages should be stated, but it should be made plain that the decision is to be made by the individual, and that a decision not to join will in no way work against him, nor will his decision to join have any great influence in his favor.

Since membership in an association is of no particular advantage to anyone except as it entitles him to participate in annual meetings, committee meetings, etc., attendance at such meetings should be encouraged by department heads, who should authorize that the expenses incurred in such attendance be paid by the railroad company. Insofar as the railroad company is concerned, I think this is sufficient encouragement, and all that should be done. The benefits which the railroad will realize are, in my opinion, sufficient to justify this expenditure.

*Past-president of the A.R.E.A. and the Roadmasters' Association.

Both Roads and Men Gain

By F. S. Schwinn*
Assistant Chief Engineer, Missouri Pacific (Gulf Coast Lines), Houston, Tex.

The question presented can be answered comprehensively by discussing any one of the associations. Let's take the American Railway Engineering Association for example. First we must have a clear understanding of the purpose of the association. The A.R.E.A., as it is commonly called, is dedicated to the advancement of knowledge pertaining to the scientific and economic location, construction, operation and maintenance of railways. This is accomplished by means of investigation, research, analysis and

*Vice-president, A.R.E.A., and chairman of its Membership Development committee.

discussion, and finally by publication of the material so collected with conclusions and recommendations.

In order that the conclusions may be representative of the best thought, the broadest field of experience, and the best technical and most practical information, it is highly desirable that the largest possible number of railroads be represented in its endeavors. As the work of the association is performed by 21 technical committees dealing with as many specialized phases of railway endeavors, it is important that each railroad have as much representation as practicable in order that the work will represent, in fact, the combined views of the specialists who are in daily contact with particular phases of railway location, construction, operation and maintenance.

The association benefits the railway industry and the individual railroad in a number of ways. It reduces or eliminates the need of individual railroad research activities; it points to ways and means of effecting economies in construction, maintenance and operation; it provides the latest recommended practices, plans and specifications for railway construction and maintenance; it affords the means of reducing costs to the extent that recommended plans and material specifications are adopted as standards, thereby simplifying mill and manufacturers' operating requirements and reducing stocks of material which must otherwise be maintained to satisfy the multiplicity of requirements of each railroad having individual standards.

But the association's influence goes beyond these more readily recognized benefits. In its committee work it affords the opportunity of developing and broadening the railroad personnel attracted to its membership. The association is one composed of individuals and, as such, it has done much toward the development of the individual. The railroads, probably more than any other industry, are continually being subjected to socializing efforts and influences. These come from without but, to flourish, they must be supported within the railroad organization. The development of the individual, as such, will go far toward offsetting these forces that urge regimentation and the elimination of private initiative. No greater benefits can accrue to the railways of North America than those which spring from the sincere efforts of the individuals who comprise the great body of railway officers, supervising officials and technicians.

Every individual railway needs the broadest possible representation in the association. This should not be limited to a few engineering officers and technical representatives. It should include operating, transportation, purchasing, stores and accounting representation. Only by means of the broadest possible affiliation and contact can the individual railway secure all the benefits that are offered by the association.

Representation through membership alone, while highly beneficial, will not provide the full measure of benefit which a railway may obtain. To secure that full measure, railway management must recognize the association's objectives and actively support those objectives. It can do this by encouraging its personnel to associate themselves with others who have the same interests. Railway management will benefit from the participation of its representation in the activities of the association. Participation in committee work is particularly desirable. Committee work is not confined to a round-table discussion of a problem or assignment. It includes a thorough analysis of the subject from every angle and a frank exchange of thought. It often includes viewing the problem in concrete form and analyzing in the field, the practical, as well as the technical, aspects.

To reap the full benefits of its representation in the association, railway management should also encourage attendance at the annual meetings of the association. It is here that the work undertaken throughout the preceding year by the committees is presented for action by the full membership. It is here that the member meets many others who have been faced with similar problems, and where he can broaden his perspective and improve his knowledge. He can return to his property better prepared to cope with his work and serve his railroad.

There can be no question regarding the importance to each railroad of adequate representation in the association. Anything short of a broad and well-balanced representation among its officers, engineers and technicians, including junior, but qualified, employees, is not adequate.

Protecting Piers Against Scour

What are the relative merits of riprap and steel sheet piling for protecting the foundations of piers and abutments against scour and under-mining? Are there more effective means?

Riprap Has Many Uses

By C. P. Howes
Bridge Engineer, Texas & Pacific, Dallas, Tex.

An entirely satisfactory comparison of the merits of riprap and steel sheet piling for the protection of piers and abutments could be made only after considering in detail a variety of specific examples. The advantages and disadvantages of each type of protection will depend on the surrounding conditions, such as masonry design, depth of footing, its support (spread footing, friction piles, point-bearing piles, etc.), characteristics of the supporting and scourable materials, characteristics of the waterway (maximum probable velocity, etc.), and particularly upon past experience at the crossing.

Riprap is indispensable in the maintenance of bridge supports and is frequently resorted to successfully at both the largest and smallest of bridges, and for both emergency and permanent protection. Small quantities of riprap are often deposited to check incipient scour where steel sheet piles would be entirely out of place. During pier sinking operations, riprap has, on occasion, rescued great river piers from destruction when threatened by untimely floods. Likewise, at relatively small cost, it has, unquestionably, greatly extended the life of innumerable bridge piers and abutments.

Aside from economic considerations, stone riprap protection has the advantage that it may be deposited with minimum delay and equipment. If suitable sizes of stone are available, and precautions against loss taken, riprap can be placed effectively regardless of river stage, even in high-velocity currents. Where suitable stone is not at hand, concrete riprap may be economical. Failures in such work are usually due to the use of stones which are too small, poor grading of the pieces, or insufficient care in placing.

For years after their introduction (some 45 years ago), interlocking steel sheet piles were extensively used for the protection of piers and abutments against scour. They appealed as a sort of cure-all for pier troubles of many kinds. Where the sheet piles are driven to a firm underlying stratum, or to depths well beneath likelihood of future scour, benefits may result. In my experience, if the work is confined to the sheet pile

wall, with perhaps a thin course of concrete between the cofferdam top and original masonry, the benefit is seldom commensurate with the cost involved.

If the conditions are sufficiently serious to justify protection of this kind, consideration may well be given to utilizing the sheet pile enclosure so as to underpin or encase the old masonry footing, or to increase its stability by driving foundation piles within the cofferdam and filling the enclosure with concrete. However, in many cases complete reconstruction is not only prudent but the economical solution. Protection of bridge piers and abutments by willow or other types of mattresses is, at times, essential in the alluvial districts traversed by this railway.

Low Cost Favors Riprap

By A. B. Chapman
Assistant Chief Engineer, Lines East, Chicago, Milwaukee, St. Paul & Pacific, Chicago

Riprap and steel sheet piling both have numerous and indispensable applications for protecting foundations against scour. Riprap is extensively used, and in numerous cases is the most economical and satisfactory solution to scour. It is readily available in many sections of the country and is placed particularly in emergencies, as a temporary, if not permanent, remedy to halt further scour and stabilize foundations.

However, care must be exercised in using riprap to know that it will not restrict the waterway seriously—there is a tendency to use it promiscuously and without careful planning. It is not expensive to place, and proper care and thought should be given to its effectiveness and permanence. In rapid streams riprap may be repeatedly lost and require replacement, and the cumulative expense may justify other means of protection. Some rock is not of durable character, and weathers or decomposes in a relatively short time.

Steel sheet piling is usually the most satisfactory means for permanent protection of foundations. Its cost, and the difficulty of driving it when headroom is limited, restrict its use to the more important structures or more serious cases of scour, where channel capacity must be retained, or where velocities preclude the use of riprap, etc. A less common use of steel sheet piling is in the construction of cut-off walls driven across the channel just beyond piers and abutments, with riprap paving between. This method is sometimes better adapted to a particular location than enclosing each pier foundation in sheet piling. When sheet piles are driven close around a pier or abutment, it is good practice to cap the space between the piling and footing with concrete. Underpinning of foundations is ordinarily done only when undermining has taken place, and seldom as a measure of protection.

Steel Sheet Piling Best

By H. M. Tremaine
District Engineer, Northern Pacific, Spokane, Washington

The purpose of any suggested method must be regarded as solely that described in the question. If the foundations of piers or abutments are of sufficient depth, or if they rest upon solid rock, no protection of the kind described is necessary.

The most effective method of providing protection is that afforded by steel sheet piling. It is important that this protection does not restrict navigable channels and it is equally important that there be no unnecessary restrictions imposed upon the flow of water by the unduly narrowing of channel widths.

Riprap provides for only surface protection; its depth is negligible. Experience has proved that it may be dislodged by scour induced by the mere additional weight of water imposed during extreme flood stages, by ice, or from other contacts. Freezing has also proved to be a displacement agent. Riprap must be inspected periodically and repaired frequently by adding more material. Riprap has proved, in some of its installations, to be a menace to navigation, and its presence has been found to restrict dangerously the flow of water in channels.

Steel sheet piling, on the other hand, if properly installed to an adequate depth, is free from the deficiencies assigned to riprap. It is undoubtedly, in many locations, more costly to provide than riprap, but its surety usually warrants the higher cost.

Few other methods of providing protection are as effective as those described. A measure of protection may be provided in some locations in fresh water by wood sheet piling, but it is difficult to drive such piling to the required depth and its use in salt water is not to be recommended for permanence, mainly because of teredos.

Methods of Finding Buried Pipes

What are the latest developments in equipment for finding the specific location of old pipe lines for which there are no records? What are their advantages over earlier equipment or methods?

Detectors Are Accurate

By R. H. Morrison
Principal Assistant Engineer, Bangor & Aroostook, Houlton, Me.

Unfortunately my experience in attempting to find buried pipe lines without some knowledge of their actual location has been rather limited. We have fairly good records of the location of our facilities and rarely have much difficulty in the respect to which the question refers.

About four years ago I did have a rather interesting experience, however, when the gravity supply line to our water tank at Patten, Me., froze up solidly and it was necessary to take immediate steps to thaw it out. We decided to use electric current for this purpose, making several connections on the line. We had some fairly good measurements on the location of this pipe line, but in order to expedite excavation to the line we borrowed an electrical locating machine owned by the local water company. With this device, which uses the principle of radio in its operation, I was able to trace out the entire length of the pipe line, erring in no place more than 2 in. This unquestionably saved considerable time in making connections to the pipe line. The advantage of this equipment over any former methods that we have used is quite obvious, in that we were able to dig down exactly to the pipe, instead of being two or three feet away from it.

Uses Electronic Locator

By E. R. Schlaf
Assistant Superintendent Water Service, Illinois Central, Chicago

The writer had occasion recently to use a late model pipe locator in connection with the elimination of water waste at a large terminal. The pipe line involved was several thousand feet long and ran through a cultivated field, under a marsh and a small stream, as well as under several railroad tracks. The line was traced

and then leak-detection equipment was used.

The locator was of the electronic type, wherein a high-frequency signal, produced by a spark coil, is fed into the line at some convenient point or points. A small portable radio with a directional antenna is used to pick up the signal. Two methods of holding the antenna are used: (1) the null method, which produces a minimum signal when directly over the pipe; and (2) the maximum-signal method which produces the opposite effect. The null method is preferable because it defines the location of a pipe more sharply.

It was found that the locator operated more effectively if the two leads from the signal generator could be hooked to opposite ends of a run of pipe. Some difficulty was experienced in certain sections of the pipe where an indecisive signal was produced. This was remedied by shortening the distance between the points where the signal was being applied.

The advantages of this method are: (1) That it is very fast; (2) that digging is held to a minimum; and (3) that it is unaffected by rails or pipe lines of other systems. However, it cannot be expected to operate efficiently in congested areas where cross connections with other pipe systems exist.

Fires in Railroad Fills

What causes fires in railroad fills and embankments? What is the best way to control such fires after they have started?

Dig Out Burning Material

By W. H. Sparks
General Track Inspector (Retired), Chesapeake & Ohio, Russell, Ky.

Nearly all roadmasters or supervisors on railroads using coal-burning locomotives have had trouble at one time or another with fires in embankments. Such fires often occur at points where unstable conditions have caused the track to settle and cinders have been unloaded on which to raise the track to grade. Most of the cinders used for such purposes are obtained from enginehouse ash pits and frequently contain varying amounts of material that is combustible.

Occasionally cinders are loaded which have not been given an adequate wetting at the cinder pits. If these hot cinders are unloaded on previously deposited cinders, a portion of which are combustible, they will smolder until enough heat is generated to start a fire. Field forces are instructed not to unload hot cinders, but even extreme care cannot prevent all such material from being used. Work-train foremen douse cars of hot cinders with water from a water column and then unload them in the belief that they have adhered to their instructions. It is questionable whether such treatment is as effective as it should be to prevent the possibility of fires.

The best way to control fires in fills is to dig out all of the burning material and replace it. To do that may require a great deal of work and cost a lot of money if the fire has been burning for some time. Other methods, however, may require more time, cost more money, and disrupt traffic to an even greater extent. Such fires can be prevented much easier than they can be extinguished—by using care in the choice of non-combustible filling material, or care in the application of hot cinders to existing fills on which inflammable material may have been previously deposited.

Fires Occur Infrequently

By E. J. Brown
Engineer of Track, Chicago, Burlington & Quincy, Chicago

This question is difficult to answer since the problem occurs so infrequently that experience in handling it is meager.

Fires in railroad fills, undoubtedly, are caused by spontaneous combustion. When a fill is made up of coal, peat, oily slate or cinders, there is a possibility of some of the material being combustible. Pressure of train loads and dead weight of the materials add to this hazard. Sometimes locomotive ash pans are dumped on sidings while waiting for trains to pass, and the hot ashes, incompletely extinguished by wetting, may cause a fire to start, if combustible material exists.

After a fire has started, great care is required to control it. There is some question in my mind as to the propriety of breaking into a fill or drilling into it as this might tend to create a draft which would accelerate the combustion. Instead, consideration should be given to removing the material and replacing it with earth.

Mechanizing Freighthouses

To what extent is the trend toward the mechanization of freight handling affecting the design or construction of freighthouses or transfer platforms? What effect does this mechanization have on the maintenance of these facilities?

Modernize, Then Mechanize

By Freight Agent

Although mechanical devices have brought about great reductions in the cost of handling merchandise freight in some modern freighthouses, mechanization is impracticable in many of the old-style stations still extant.

According to a report presented before the recent convention of the Association of American Railroad Superintendents, no prudent officer should recommend the complete mechanization of any freighthouse which is obsolete in its physical characteristics. Instead, such an officer should consider the probable savings which might be realized through the use of a *new* facility designed for mechanized freight handling.

The report further stated that, barring local conditions, the basic factors which should be adhered to in the design of freighthouse facilities are: (1) Driveways of sufficient width to accommodate modern highway vehicles; (2) inbound house wide enough to permit adequate zoning of freight by locations (60 ft. being considered satisfactory), keeping the freight "on wheels" either by the use of pallets, live skids, rebo-racks or similar contrivances to avoid the necessity for rehandling; (3) apron or island platforms wide enough to allow the free flow of mechanized equipment—the minimum width being 24 ft. with roof supports on the edges of the platform; (4) tracks laid out so as to have an island between each set of two tracks so that all cars can be worked without the necessity of moving through other cars; (5) outbound

house wide enough to afford ample room for unloading and distributing freight from trucks, yet narrow enough to avoid excessive running distances between tracks and cars (40 ft. being a satisfactory width); and (6) two-way communication with outlets to cover the station and platform areas.

Additional requisites of stations, in which mechanized equipment is to be used, include plenty of aisle room, good floors, and adequate lighting. Large freighthouses should also have lift bridges between the house proper and the island platforms, so located that the tracks are spanned with minimum travel distance.

In addition to these feaures which will make the mechanical handling of freight more effective, it must not be forgotten that mechanized freighthouses should have facilities designed for servicing the various types of equipment used. These should include storage facilities for gasoline, oil, and grease, all of which should be separated from merchandise to prevent contamination. Furthermore, such servicing facilities should always be of fireproof construction.

Where adequate space is not available on a single floor, ramps should be built between floors in lieu of elevators, although it is usually advisable to have one elevator to handle special shipments not readily handled by truck or trailer. In addition, ramps between the cellar and first floor might simplify the problem of handling ashes and supplies.

Wood Floors Unsuitable

By Leo Denz
Chief Carpenter, Chicago, Milwaukee, St. Paul & Pacific, Chicago

Handling freight with automotive equipment is becoming routine in our larger freighthouses. Experience has shown that the movement of freight at high speed with this type of heavy equipment will wreck a wood floor in a short time. Floors with wood posts and sills, 3-in. by 12-in. joists, 2-in. sub-floors and 1⅛-in. D. & M. maple wearing surface will not last much over a year under such service. In fact, some floors constructed with three-inch sub-flooring have been ruined in about one year. I believe that the type of floor which is best adapted for use in freighthouses where high-speed automotive equipment is operated is a concrete slab placed on a solid fill.

If the speed of lift trucks were confined to the maximum of five m.p.h., wood floors could be maintained at relatively small expense. However, for even slow-speed operation of trucks, a wood floor should be built extra heavy in all runways and aisles, in contrast to the rest of the floor which could be of the usual type of construction.

In the sturdier parts of the floor, the supporting posts should be placed on a solid foundation. The sub-floor should consist of four-inch plank. This would require a four-inch joist to receive, without splitting, the proper size of spikes from the sub-flooring.

Flooring For Small Stations

What type of flooring is best adapted for use in small passenger-station waiting rooms? In office areas? Toilets? Why?

Prefers Asphalt Tile

By O. G. Wilbur
Assistant Engineer of Buildings, Baltimore & Ohio, Baltimore, Md.

Asphalt-tile flooring can be successfully used in waiting rooms and office areas in small passenger stations. If applied over wood flooring, either new or old, it should be laid on a ½-in. thickness of the tile manufacturer's base material, applied in accordance with the manufacturer's specifications. If it is laid on a concrete base, it should be laid in accordance with the manufacturer's directions.

Ceramic tile, terrazzo, colored concrete, or asphalt tile are all good materials for use in toilet rooms. The use of asphalt-tile, however, in toilet rooms is not permitted in all states.

We feel that the use of this type flooring provides a good wearing surface, has a pleasing appearance and lends itself to a satisfactory sanitary condition when propery cleaned. Care must be taken, however, in cleaning the asphalt-tile floor as certain types of cleaner are injurious and advice from the manufacturer should be obtained on this detail. [See page 416, April, 1948, issue of *Railway Engineering and Maintenance*—Editor]

Asphalt Tile Blends Well

By Harry N. Bevers
Firm of Otto E. Brunkow, Architect, Chicago

In my opinion, asphalt tile not less than 3/16 in. in thickness is probably the best flooring material that can be obtained for this purpose. It is a sturdy, tough material with very good wearing qualities and small maintenance costs. The material is easily installed and is in general use throughout the country. Furthermore, skilled installers are available in nearly every community.

Asphalt tile is a modern material and fits into practically every modern architectural design, as well as being especially fitting for modernization programs in older buildings. With the new plastic fillers now being used, irregularities or unevenness in the old flooring can be adjusted before installing the tile. The wide range of color schemes, patterns and striping give inexhaustible possibilities in the matter of design.

I would say that this same material should be used in office areas, and for the reasons already stated. In addition, installers, being already on the job, can apply the same materials at a considerably lower unit cost over the larger area.

The flooring to be used in toilet rooms should be sanitary and easy to keep clean. A type of flooring that meets these requirements is the ceramic mosaic tile. This flooring has a higher first cost but its lower maintenance requirements and neat appearance more than offset this expense. In a building that requires constant maintenance, but actually is subject to more neglect probably than other railroad property, any material, whether flooring or otherwise, should be selected for its durability, resistance to abuse, and minimum upkeep cost.

Romany Tile Is Durable

By W. L. Darden
Engineer of Buildings, Seaboard Air Line, Norfolk, Va.

In view of the prevalence of termites, particularly in southern areas, I believe that we should get away from the use of wood for floors as far as practicable. It is my personal view that quarry or Romany tile makes very satisfactory and durable floors for small waiting rooms. In toilets, I prefer Ceramic-tile floors and Ceramic-tile wainscoating. Concrete floors with asphalt-tile wearing surfaces are very satisfactory for office purposes.

PRODUCTS OF MANUFACTURERS

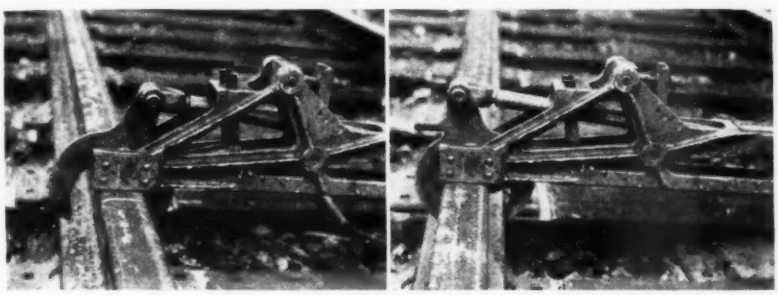
New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 957)

New Gaging Tool

THE development of the Trakgager, a one-man tool for bringing track rails to gage and holding them in position for spiking, has been announced by the Nordberg Manufacturing Company, Milwaukee, Wis. This unit, which has undergone extensive service tests in rail-laying operations on an eastern road, is intended primarily for use with the Nordberg spike driver for operation by a gaging team of four men. Such a team, it is said, will gage as much track as three hand-gaging teams of three men each.

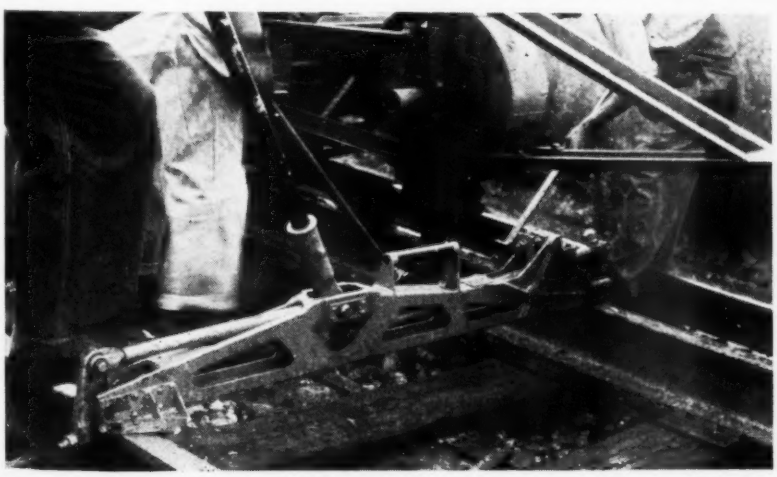
The Trakgager embodies a lever system which is contained within a cast aluminum frame. The lever system includes an operating lever, a "Y"-shaped gaging fork, a pair of adjustable gage stops, and a clamping lever. In operation, the unit is placed across the rails, square with the track, with the open end of the fork extending down over the head of the rail being gaged. Pushing the operating lever toward this rail causes the inside finger of the gaging fork to push the rail outward and permits the gage stops to fall inside the rail. When the gage stops fall, a pair of indicators also fall, thus signaling the operator that the stops are in position. Moving the operating lever in the opposite direction causes the fork to move the rail in until the head contacts the gaging stops at the correct gage. Continued pressure on the operating lever holds the rail to gage while it is being spiked.



Left—In this view the gaging fork is moving the rail outward to clear the gaging stops. The gage-stop indicators, projecting above the tool at the center of the view, are still in an elevated position. Right—The fork has engaged the outside of the rail and has moved it in against the gage stops. The indicators have dropped to signal the fact that the rail is ready for spiking.

The fingers of the gaging fork engage the web of the rail near the neutral axis, thus imparting a sliding action to the rail when moving it to gage, rather than the tilting action that is imparted when a lining bar is placed under the rail base in gaging. This feature is said to result in more uniform gage than is possible when performing the work in the ordinary manner.

The gage stops may be adjusted to produce any gage between 4 ft. 8¼ in. and 4 ft. 8¾ in., and may be locked in position at the desired gage. The weight of the tool is 47 lb.



The Trakgager in use in a rail-laying operation. Nordberg power spike driver shown in the background

Lightweight Welding Helmet

AN economical welding helmet weighing only 19 oz. has been announced by Willson Products, Inc., Reading, Pa. It is made in one piece of vulcanized fibre, riveted at the overlapping seams. When in place for welding the helmet extends below and under the chin as well as over the ears for protection from flying sparks and hot metal.

The helmet is said to be well balanced and easily swung off the face for quick inspection of work. A spring action at the hinge keeps the helmet in a raised position when not in use. Comfort features include an adjustable headgear which can be readily fitted to head size by a screw clamp, and a replaceable leather sweatband for absorbing perspiration.

The new helmet contains the protective features of the Willson-Weld

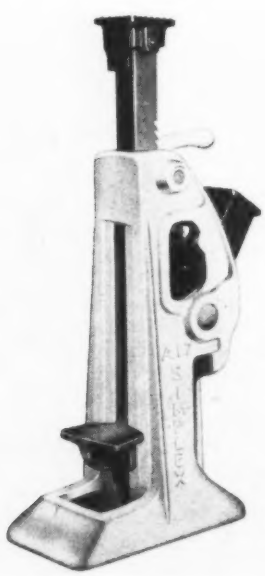
A welder working with the new Willson lightweight welding helmet

lens—a special-formula lens which is said to exceed the United States Federal Specifications for optical quality and protection. Willson-Weld glass is available in 12 different shades to meet the requirements of various jobs. The welding glass is protected from pitting by a clear glass cover. Both lenses are said to be easy to remove and insert.

Aluminum-Alloy Simplex Track Jack

A NEW Simplex track jack, recently announced by Templeton, Kenly & Co., Chicago, is provided with an aluminum-alloy housing for lighter weight and easy handling. Designated as No. A-17, the new jack, which has a lifting capacity of 15 tons, is reported as being as rugged as other Simplex jacks made with malleable iron housings, due to the fact that the housing sections are increased by 40 per cent to provide the necessary strength.

Another feature of the new jack is the provision of a larger toe lift (2½ in. by 3¾ in.), which is said to permit the jack to set more firmly in ballast and also to enable its use in lifting the ends of ties, as when raising track with power tamping machines, without damaging them. Other specifications for the A-17 jack are: Height, 22¾ in.; weight, 41½ lb.; lift, 13 in.; minimum height of toe lift, 2¼ in.



One of the Simplex A-17 aluminum-alloy track jacks

Burt Quadrant Transit

FENTON Crafts, Fenton, Mich., is offering an economical, lightweight surveying instrument, known as the Burt Quadrant Transit, which, it is said, can be used by non-technical men for setting lines or grades for foundations, walls, fences, ditches, tiling and similar projects. It can also be used for measuring or laying out both horizontal and vertical angles. The total weight of the complete instrument is 5 lb.

The complete assembly consists of an aluminum transit head mounted on a swivel stand, a leveling base and a 54-in. adjustable tripod. The instrument is leveled by two spirit levels and adjusting screws, and is centered over the desired location by means of a plumb-bob.

The transit head has two separate sights, each having a pin-hole at the sighting end and cross hairs etched on plastic pieces at the other. One of these sights is fixed in position while the other, starting from a position at 90 deg. with the fixed sight, can be turned in a horizontal plane in such a way as to form any angle through a range of 60 deg. with the fixed sight. The angular movement of the movable sight relative to the fixed sight is measured on a scale marked in degrees. By turning the entire transit head through increments of 90 deg., which are marked on the leveling base, and the movable sight through its 60 deg. range, any angle throughout a full circle can be measured or laid out. In measuring vertical angles the entire transit head is turned in a vertical plane, the angle being read on another scale marked in degrees from 0 to 60.

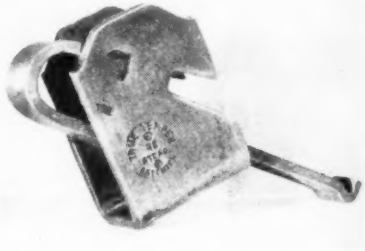
When removed from the stand and tripod, the instrument head may be independently leveled and located with or without the plumb-bob, and may also be used as a combination two-way level and try square.

The Burt Quadrant Transit

Improved Rail Anchor

THE American Fork & Hoe Co., Chicago, has announced an improved anti-creeper, known as the True Temper rail anchor, which incorporates a number of refinements of this company's Stead rail anchor. The new anchor has been redesigned to provide a greater bearing area against the tie and to simplify the operation of applying the rail anchor to the rail.

It consists of a U-shaped clamp, 3 in. wide, provided with slots designed to fit tightly on the base of the rail, and a loop spring which locks the clamp in place. The slots are designed, it is said, to compensate for any variation in the rail base due to wear or corrosion.



The new True Temper rail anchor

The new anchor can be applied by one man using a sledge, spike maul or similar striking tool. To apply

(*Continued on page* 946)

(For additional information on any of the products described on this page, use postcards, page 957)

A NEW TRACK TOOL . . .

. . . lighter, more efficient, more durable . . . will be on display in the WOODINGS' booths (93 & 94) at the Track Supply and the Bridge and Building exhibits, Hotel Stevens, Chicago, Sept. 20-21-22.

WOODINGS FORGE AND TOOL CO.
WOODINGS - VERONA TOOL WORKS
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the anchor a blow is struck on the loop portion of the spring, thereby moving the spring into contact with the base of the clamp and carrying the anchor to the proper position on the rail base. It is said to be impossible to overdrive the True Temper rail anchor.

Clay Spade

LE ROI Company, Milwaukee, Wis., is now offering the Le Roi 31 clay spade, a new air-operated digging tool which weighs only 18 lb. and is

Excavating a pit with the Le Roi 31 clay spade

19 in. length. It is pointed out that these features contribute to easy handling and less fatigue on the part of the operator.

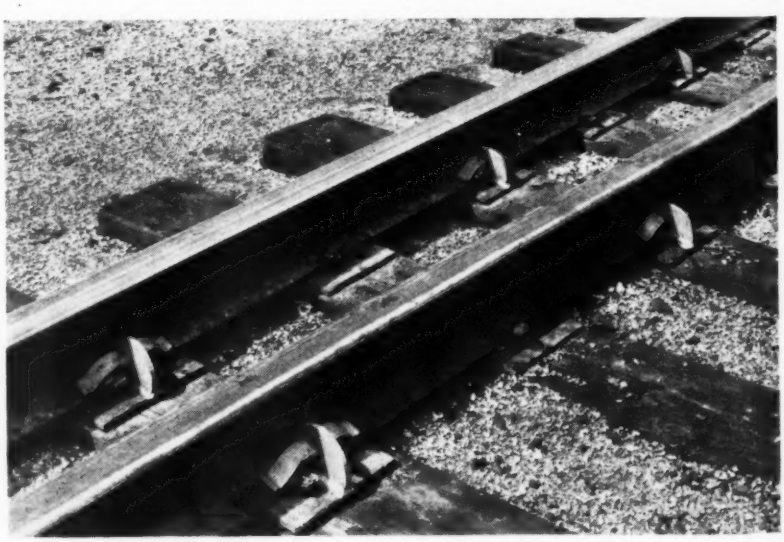
A feature of the spade is the lubricating system in which oil from a large reservoir in the handle is metered into the main air stream and is thus carried, it is said, to all moving parts of the tool. This system, together with a special front-end sealing arrangement, is said to exclude dirt and foreign matter and to increase operating efficiency as well as tool life expectancy. Other features include a forged cylinder handle and retainer. The spacer and chuck are renewable.

New Rail Anchor

G & H RAIL Controls, Inc., Kansas City, Mo., has developed a new anti-creeper, called the No-Creep rail anchor, which is designed on the principle of maintaining sufficient compression between tie plates and the rail base to control the running of the rails by friction. It is a two-way anchor consisting of a bow-shaped steel spring with dimensions of ¼ in. by 1¼ in. by 6½ in., held in compression against the upper surface of the rail base by a hold-down clip welded to the tie plate. When installed the spring is deflected 5/16 in.

The No-Creep anchor, it is said, can be applied on any weight of rail and with any design of tie plate. It is said to compensate for wear and corrosion, and to eliminate the need of adjustment. It is claimed that anchors of this type which were installed in main-line track in October, 1947, have required no attention to date. In the event of a derailment, the anchor is reported not to injure the rail base.

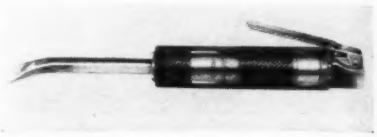
If the anchors are to be used in conjunction with new tie plates, the holddown clips may be welded to the tie plates at the factory, or the welding may be done at a central point before the tie plates are distributed. Also, if desired, the clips may be welded to tie plates already in the track. The time required for the welding operation is said to be less than one minute for each anchor. The spring is installed with a tool designed especially for that purpose, or it may be driven into place by a spike maul.



An installation of No-Creep rail anchors in a turnout

Scaling Hammer

THE Master Pneumatic Tool Company, Inc., Orwell, Ohio, has added to its line of portable pneumatic tools



The Master Model M-205 scaling hammer

a new scaling hammer for such work as peening, beading and caulking; removal of splatter and excess metal after welding; removal of rust, scale, paint, mortar and plaster; and many other operations where a small, percussion-type unit is required. Called the Master Model 205, the new tool is said to be simple in design, light in weight and economical in air consumption.

The tool is available with either a push-type or lever-type throttle, as desired. When in operation complete control of the tool by the operator is assured, it is said, by a knurled grip area on the body, along with easy feathering of either type of throttle. It contains a self-seating type of valve, which is said to perform satisfactorily for the life of the tool. Its back head has a positive, self-locking device which is claimed to seal the valve mechanism against air leakage and dirt. The chisel-retaining sleeve will hold a chisel in four different positions and is said to be so designed that a change in chisels can be made quickly and easily. The M-205 has a 1-in. bore, a 1⅛-in. stroke, is 8¼ in. long. and weighs 3¼ lb.

(For additional information on any of the products described on this page, use postcards, page 957)

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because it goes where the work is

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You will want bulletin FC 48 giving all the facts about Schramm's Model 60 Crawler. Write the Railway Sales Division for your copy today.

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Capacity 60 cubic feet per minute actual air at 100 pounds p.s.i. Perfect for four tampers or other tools.

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THE MONTH'S NEWS

Happenings among the railways—the associations—the suppliers

Changes in Railway Personnel

General

J. R. Taylor, assistant valuation engineer on the Missouri Pacific, has been appointed assistant to general manager, with headquarters at Houston, Tex.

J. B. Nance, vice-president and general manager of the Maryland & Pennsylvania, with headquarters at Baltimore, Md., and an engineer by training and experience, has been elected president and general manager.

R. L. Pearson, vice-president, executive department, of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., and formerly chief engineer, has retired because of ill health, after serving the New Haven for more than 44 years.

Engineering

Joseph G. West, whose appointment as district engineer on the Gulf, Colorado & Santa Fe (part of the Atchison, Topeka & Santa Fe System) with headquarters at Galveston, Tex., was noted in the June issue, was born at Wichita, Kan., on July 14, 1905, and received his higher education at the University of Colorado.

Joseph G. West

He entered the service of the Santa Fe in June, 1922, and after serving in various capacities in the engineering dpartment, was appointed division engineer of the Panhandle & Santa Fe in August, 1942.

J. R. Cunningham, Jr., assistant engineer on the Virginian, with headquarters at Roanoke, Va., has been transferred to Norfolk, Va.

J. Conrad, assistant engineer of the Canadian National at Vancouver, B. C., has been appointed assistant district engineer, with the same headquarters.

Albert D. Perkins, assistant engineer on the Western lines of the Southern, has been promoted to assistant to chief engineer maintenance of way and structures on the same lines, with headquarters as before at Birmingham, Ala.

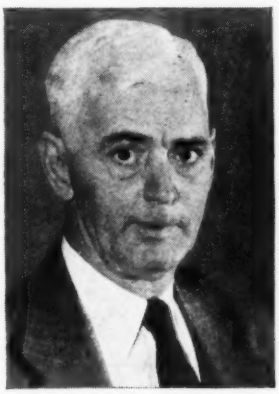
D. W. Blair, assistant engineer of the Levis division of the Canadian National, has been promoted to division engineer of the Laurentian division at Quebec, Que., succeeding **J. G. A. Sawyer,** transferred.

W. J. Savage, assistant engineer of the Missouri Pacific, at St. Louis, Mo., has been appointed assistant chief engineer of the Texas & Pacific, with headquarters at Dallas, Tex., succeeding **W. T. Alexander,** who has been promoted to division superintendent of the T. & P. at Big Spring, Tex.

J. S. Hestle, assistant division engineer of the Louisville & Nashville, Pensacola, Fla., retired on July 31 after 46 years of service. **Claude Johnston** has been appointed assistant division engineer to fill the position vacated by Mr. Hestle, but with headquarters at Mobile, Ala.

George R. Westcott, whose retirement as assistant engineer on the Missouri Pacific at St. Louis, Mo., was reported in the July issue, was born on August 18, 1879, at Goodwin, S.D., and was graduated from South Dakota State College with a Bachelor of Science degree in 1903. He entered the service of the Missouri Pacific in December, 1909, as an instrumentman and draftsman in the office of the chief engineer at St. Louis. In April, 1917, Mr. Wescott was promoted to assistant engineer, serving in the offices of the chief engineer and district engineer at St. Louis until April, 1920, when he was transferred to Poplar Bluff, Mo. He returned to the district engineer's office at St. Louis in April, 1925, and three months later was appointed assistant engineer in the offices of the chief engineer and chief engineer maintenance of way.

C. B. Bronson, inspecting engineer, New York Central System, has been promoted to assistant engineer maintenance of way —system, with headquarters remaining at New York, succeeding **Charles H. Morse,** deceased. Mr. Bronson was born at Akron, Ohio, and received his engineering



C. B. Bronson

degree from what is now Illinois Institute of Technology, and was an instructor for two years. He entered railway service in 1913 with the New York Central Lines (System) on special assignments for Dr. P. H. Dudley, consulting engineer, rails, ties and structural steel. He then became assistant inspecting engineer in 1924 and inspecting engineer in 1934, serving in that position until his promotion.

Ralph R. Strother, whose retirement as assistant chief engineer of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, at Chicago, was reported in the August issue, was born on August 17, 1885, at Hubbard, Iowa. Mr. Strother was graduated by Iowa State College with a degree in civil engineering in 1909, and shortly thereafter joined the engineering department of the C. & N. W. In 1914 he became assistant engineer on field work for the C. St. P. M. & O., and in 1920 was appointed assistant engineer in charge of estimates. He was advanced to assistant chief engineer in 1929, and in 1938 was appointed also superintendent of ways and structures. Mr. Strother was elevated to chief engineer of the C. St. P. M. & O. in 1940, with headquarters at St. Paul, Minn., and held that post until March, 1943, when he went to Chicago as assistant chief engineer of the latter road and the C. & N. W.

(*Please turn to page* 950)

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Railway Personnel (Cont'd)

W. K. Wallace, chief civil engineer, London Midland Region, British Railways, London, England, and widely known in railway engineering circles in the United States and Canada, retired from active service on August 31. He is succeeded by **James Briggs,** formerly assistant chief engineer, London Midland Region.

Benjamin T. Leland, Jr., whose promotion to assistant engineer of the Delaware, Lackawanna & Western, with headquarters in Hoboken, N.J., was announced in the June issue, was born on February 15, 1920, in Pittsburgh, Pa. He attended Union college, Schenectady, N.Y., and graduated with a B.S. degree in civil engineering in June, 1942. After a brief period with the Delaware & Hudson, he entered the Navy, in which he served as a fighter pilot until January, 1947, when he again entered railway service as a draftsman on the D. L. & W., with headquarters at Scranton, Pa., the position he held at the time of his recent promotion.

Belsur Bristow, division engineer of the Burlington-Rock Island, with headquarters at Houston, Tex., has been promoted to the newly-created position of engineer maintenance of way of the Chicago, Rock Island & Pacific, with headquarters at Chicago. The position of chief engineer maintenance of way and structures formerly held by **H. T. Livingston,** whose death is reported elsewhere in these columns, has been abolished. **W. H. Bogle** has been appointed division engineer at Houston to succeed Mr. Bristow. **F. W. Madison** has been appointed acting division engineer on the Rock Island at Kansas City, Mo., replacing **J. T. Fitzgerald,** who has been promoted to construction engineer on a special project at Kansas City.

Track

D. H. Keen has been appointed acting roadmaster on the Atlantic Coast Line, at Thomasville, Ga.

J. T. Cameron, roadmaster on the Grand River, at Preson, Ont., has retired after 41 years of service.

E. Marcotte, section foreman on the Laurentian division of the Canadian National, has been promoted to roadmaster, with headquarters at Parent, Que., succeeding **J. H. Gravel.**

F. C. Griffiths has been appointed acting roadmaster on the Canadian National, with headquarters at Stratford, Ont., to succeed **J. Billo** who has been granted a leave of absence because of illness.

W. F. Baker has been appointed roadmaster on the Chicago & North Western, with headquarters at Huron, S. D., succeeding **T. G. Mingus,** who has been transferred to Chadron, Neb.

J. T. Cooper, junior engineer on the Columbus division of the Pennsylvania, with headquarters at Columbus, Ohio, has been promoted to assistant supervisor on the Chicago Terminal division, with headquarters at Colehour, Ill., succeeding **A. J. Heacox,** who has been transferred to the Middle division, at Newport, Pa. Mr. Heacox replaces **G. P. Campbell,** who has resigned.

E. J. Sierleja, assistant supervisor of track on the Maryland division of the Pennsylvania, with headquarters at Baltimore, Md., has been promoted to supervisor on the Indianapolis division, with headquarters at Columbus, Ind., succeeding **R. M. Buchanan,** who has been transferred to Kittanning, Pa., on the Conemaugh division. Mr. Buchanan, in turn, succeeds **J. L. Forrester,** who has been transferred to the Eastern division at Alliance, Ohio, where he succeeds **G. L. Godley,** who has resigned. **H. K. Roche,** junior engineer on the Maryland division, has been promoted to assistant supervisor at Baltimore.

William H. Horner, whose appointment as general roadmaster on the Terminal Railroad Association of St. Louis, with headquarters at St. Louis, Mo., was noted in the July issue, was born at Woodbine, Ky., on March 6, 1891. He entered railroad service in March, 1904, as a lamp-

William H. Horner

lighter and laborer on the Louisville & Nashville, and in May, 1909, he went with the Terminal Railroad as a track laborer. A year later he was made assistant foreman, and in August, 1911, was further advanced to extra gang foreman on the East St. Louis division. Mr. Horner was appointed track supervisor in May, 1920, which position he held until his recent promotion.

Bridge and Building

Frank Duresky has been appointed supervisor of bridges and buildings on the Chicago & North Western, with headquarters at Huron, S. D., to succeed **Elmer Nelson,** who has resigned.

Charles Owens has been appointed supervisor of bridges and buildings on the New York, Ontario & Western, with headquarters at Middletown, N. Y.

L. A. McGovern, bridge inspector on the Central of Pennsylvania (Jersey Central Lines in Pennsylvania), has been promoted to assistant master carpenter and bridge inspector on the Southern division of the Central of New Jersey, with headquarters at Long Branch, N. J.

Water Service

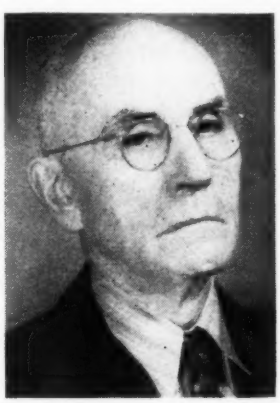
E. R. Schlaf, assistant to superintendent water service of the Illinois Central, with headquarters at Chicago, has been promoted to assistant superintendent water

E. R. Schlaf

service, with the same headquarters, succeeding **J. P. Hanley** who retired on July 31, after 50 years of service.

Mr. Schlaf was born on December 2, 1912, at Minonk, Ill., and was graduated from Blackburn college, Carlinville, Ill., in 1932. He entered the service of the I. C. in 1936 as a water chemist at Dubuque, Iowa, and was advanced to water works supervisor at Waterloo, Iowa, in 1942. In 1946 he was appointed assistant to superintendent of water service at Chicago.

Mr. Hanley was born at Ramsey, Ill., on February 3, 1879, and entered the service of the Illinois Central in August, 1898, as a water pumper at Ramsey. From September, 1904, to September, 1917, he



J. P. Hanley

served successively as division foreman of water service at Clinton, Ill., and Chicago. On the latter date he was appointed inspector of water service, and in November, 1946, he was advanced to assistant superintendent water service.

(*Please turn to page* 952)

"You did such a good job when you sprayed last September the Boss won't OK another contract, for spring spraying. Our track is as free from weeds as my glass-covered desk."

"That is most unusual. What is your explanation?"

"Well, to start with I sure got a kick out of this work. Every man in our management from the President down, bucked me when I insisted upon using your chemical weed killer. You recall you submitted the contract in June, but it was held up so long that it was late September before I got the green light on it. We did the spraying against your company's recommendation—in fact, we all but froze to death on the spray train while applying the weed killer."

"But we sure knocked down the weeds, and conditions were so bad prior to treatment that we had trouble locating the rails. I sure want to continue having you apply chemical, but I must now sell the Boss on the idea that the way to keep a clean roadbed is to continue to use the chemical each year and never give the weeds a good start again."

* * * * * * *

Well Mr. Manager, we confess that this result surprised us as much as it did your Maintenance Engineer. It proved beyond a doubt that a fall treatment pays off in reduced growth in the next growing season. Apparently we not only killed the weeds but we destroyed the seeds, so little or nothing appeared in your roadbed when the new growing season arrived.

It may even pay you well to make two treatments, one in the early growing season and one in the late summer, or early fall. Quite a few of our customers now follow this practice.

However, you will make a big mistake if you omit to approve our new contract. We did a good job for you on your first treatment, but weed killer pays off best when you can know you are applying the chemical not so much to destroy what few weeds still appear in your roadbed, as to assure that new growth does not creep in. In other words, weed killer serves two purposes—it destroys a large percentage of existing growth, and over a period of years it brings the surface of the ground to a state where it resists germination of new growth.

READE MANUFACTURING COMPANY, INC.

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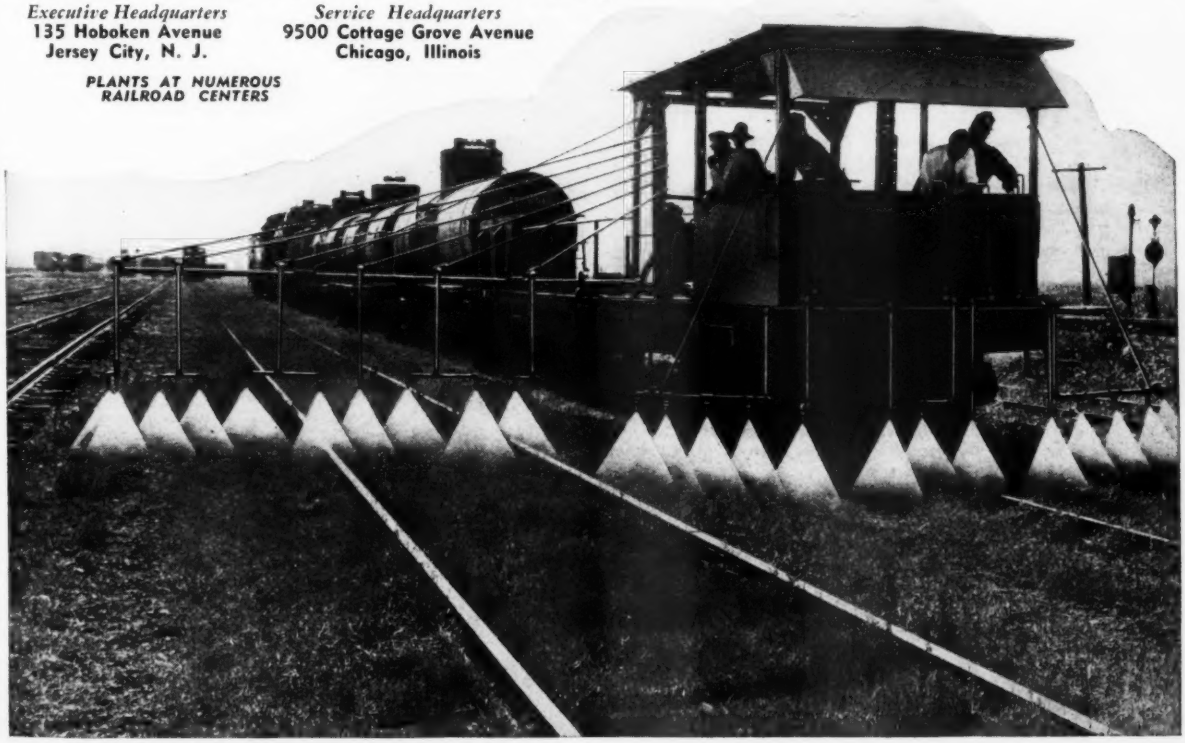
Jersey City, N. J.

Service Headquarters
9500 Cottage Grove Avenue
Chicago, Illinois

PLANTS AT NUMEROUS RAILROAD CENTERS



Railway Personnel (Cont'd)

Obituary

Clarence Richard Knowles, who retired in 1942 as superintendent of water service of the Illinois Central, at Chicago, and who was associated for 28 years with the Railway Engineering & Maintenance Cyclopedia in editorial capacities, died in his

Clarence R. Knowles

sleep at his home in Chicago on August 6. He was born at La Porte, Ind., on July 7, 1879, and attended Farrell's School for Boys, Hopkinsville, Ky., and took special courses in private schools and an International Correspondence Schools course in civil engineering. Mr. Knowles entered railroad service in 1900 as a water service repairman on the I. C., and in 1902 was promoted to water service foreman. Four years later he was appointed inspector of water service, advancing to general foreman of water service in 1912. He was further promoted to superintendent of water service in 1916, which post he held at the time of his retirement from railroad service. Mr. Knowles had been active in the American Railway Engineering Association, of which he was a director from 1930 to 1933, chairman of the Water Service committee from 1922 to 1930 and chairman of the Maintenance of Way Work Equipment committee from 1931 to 1937. He was president of the American Railway Bridge & Building Association in 1921 and 1922. He served as associate editor of the 1948 edition of the R. E. & M. Cyclopedia until shortly before his death.

James Cowley, retired track supervisor of the Missouri Pacific, died at the Missouri Pacific hospital, St. Louis, Mo., on August 8 at the age of 86.

J. R. W. Ambrose, retired superintendent of the Toronto Terminals railway, and formerly chief engineer for that road, died at Toronto, Ont., on June 29.

Harold T. Livingston, chief engineer, maintenance of way and structures, of the Chicago, Rock Island & Pacific, with headquarters at Chicago, died at St. Luke's hospital in that city on July 31, following a brief illness. A photograph of Mr. Livingston and a sketch of his career appeared in the March issue, in connection with his promotion to chief engineer maintenance of way and structures.

Ward J. Cable, district engineer of the Minneapolis, St. Paul & Sault Ste. Marie at Stevens Point, Wis., died on July 23, following an illness of three weeks. He was born at Gladstone, Mich., on July 14, 1904, studied engineering at the University of Minnesota and began his career with the Soo line in 1923 as a chainman. Mr. Cable was appointed rodman in 1926, instrumentman in 1929 and assistant engineer in 1930. He was appointed district engineer with headquarters at Stevens Point in June, 1935, continuing in this position until the time of his death.

Charles H. Morse, assistant engineer maintenance of way of the New York Central System at New York, whose death was reported in the August issue, was born on September 14, 1885, at Brandon, Vt., and first entered railway service on August 13, 1902, as a clerk in the office of the superintendent of the N. Y. C. at Watertown, N. Y. Five years later he was transferred to the engineering corps of the maintenance of way department, holding successively the positions of chainman, rodman and transitman at Watertown, until October, 1909. He then became a draftsman in the office of the engineer maintenance of way at New York, and while holding this position he attended evening classes at Columbia university during the next two years. Mr.

Charles H. Morse

Morse was promoted to assistant supervisor of track at Hudson, N. Y., on June 20, 1912, subsequently holding this position at Poughkeepsie, N. Y., and Corning. In September, 1920, he was further advanced to supervisor of track at Clearfield, Pa., later holding this position at Kingston, N. Y. He was promoted to general track inspector in April, 1929, with headquarters at New York, and in March, 1933, he was further advanced to assistant engineer in the office of the chief engineer maintenance of way of the system, with the same headquarters. In 1937, Mr. Morse was appointed office engineer in the same office, and late in 1940 he was promoted to assistant engineer maintenance of way—system, with headquarters at New York, the position he was holding at the time of his death.

Association News

American Railway Engineering Association

A total of 17 committees has arranged to hold meetings during the month of September. Of these, 12 will be held at the Hotel Stevens, Chicago, during the conventions of the Roadmasters' Association and the American Railway Bridge and Building Association, September 20-22. These 12 committees include those on Roadway and Ballast, which will meet on September 21 and 22; Rail, September 21; Track, September 22; Buildings, September 21 and 22; Wood Bridges and Trestles, September 21; Records and Accounts, September 20, 21 and 22; Economics of Railway Location and Operation, September 21; Cooperative Relations with Universities, September 21; Maintenance of Way Work Equipment, September 21; Clearances, September 20; Waterproofing, September 21 and 22; Impact and Bridge Stresses, September 21; and Water Service and Sanitation, September 21.

Another committee—that on Uniform General Contract Forms—will meet at Chicago during the convention period—September 20 and 21—but its sessions will be held at the association's headquarters, 59 E. Van Buren street. The committee on Economics of Railway Labor, will meet on September 23.

Other meetings scheduled during this month are those of the Committees on

(*Continued on page* 954)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 20-22, 1948, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 15-17, 1949, Chicago. W. S. Lacher, secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual Convention April 26-28, 1949, St. Louis, Mo. H. L. Dawson, secretary-treasurer, 1429 Eye street, N.W., Washington 5, D.C.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 20-22, 1948, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association. E. C. Gunther, secretary, 122 S. Michigan avenue, Chicago 3.

Maintenance of Way Club of Chicago—Next meeting, October 25, 1948. Headquarters 105 W. Adams street, Chicago 3.

Metropolitan Maintenance of Way Club—John S. Vreeland, secretary, 30 Church street, New York.

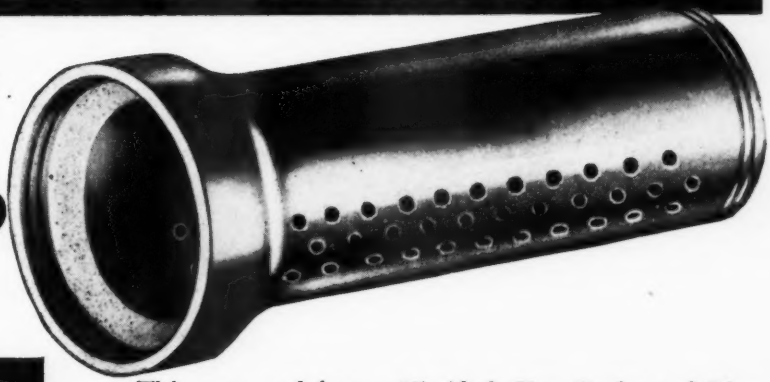
National Railway Appliance Association—Annual exhibit, Chicago, March 14-17, 1949, in connection with the A.R.E.A. convention. R. B. Fisher, secretary, 1 No. LaSalle street, Chicago 4.

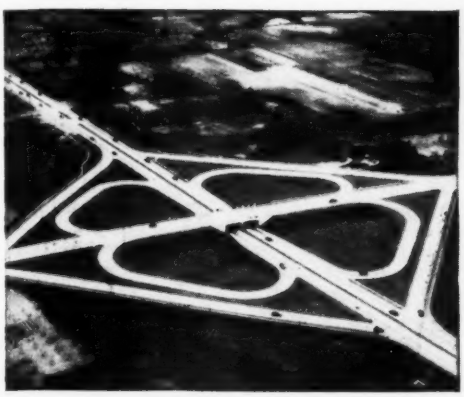
Roadmasters' and Maintenence of Way Association of America—Annual meeting, September 20-22, 1948, Hotel Stevens, Chicago. Elise LaChance, secretary, 431 S. Dearborn street, Chicago 5.

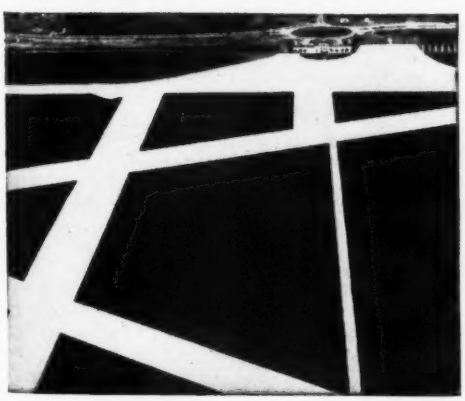
Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 20-22, 1948, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association. Lewis Thomas, secretary, 59 E. Van Buren street, Chicago 5.

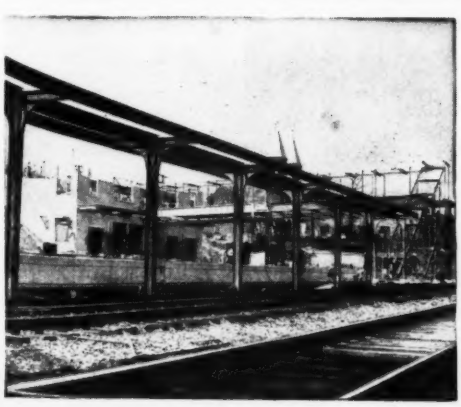
SOMETHING *New* IN UNDERDRAINAGE . . .

IMPROVED PERFORATED CLAY PIPE









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Association News (Cont'd)

Highways, which will meet at the association's headquarters, September 16 and 17; Masonry, which will meet at Urbana, Ill., September 28 and 29; and Yards and Terminals, which will meet at Toledo, Ohio, September 14, 15 and 16.

As a result of the large number of new members currently being acquired by the association, the Board of Direction has issued new regulations governing membership on the technical committees, which are designed to create openings on the committees and thus permit the new members to take an active part in the affairs of the association.

Railway Tie Association

As this issue of *Maintenance* is mailed to subscribers, the Railway Tie Association is holding its Thirtieth Annual Convention at the Greenbrier Hotel, White Sulphur Springs, W. Va., August 30, 31 and September 1. The program of the three-day meeting contains a large number of addresses and committee reports, many of which are of direct interest to railway maintenance officers. Among the addresses in this category is one on What the Railroads Need from the Tie Industry, by Julius H. Parmelee, vice-president, Association of American Railroads; another on Crossties—Who Is the Responsible Manager? by J. B. Akers, chief engineer, Southern; and still another on What the Tie Industry Needs Most from the Railroads, by W. E. Tiller, Tiller Tie & Lumber Co., Little Rock, Ark. Still another address of importance is that of J. H. Aydelott, vice-president, Association of American Railroads, at the Annual Luncheon on August 30. Committee reports of special interest to users include those on the checking and splitting of crossties, timber conservation, mechanical handling of crossties, and on tie specifications.

Supply Trade News

General

Sperry Products, Inc., operators of the **Sperry Rail Service** for testing rails in track, has moved its plant and general offices from Hoboken, N. J., to Danbury, Conn., effective August 20. The company will occupy a new three-story office building and monitor-type manufacturing building, which have been constructed on a 20-acre site.

The **General Electric Company** has announced the location of its welding equipment divisions at Fitchburg, Mass. Under the new organization, the sale of G. E. welding products for the entire New England area will be handled by the **Welding Engineering Sales Corporation,** Boston, Mass. In addition, portions of western Massachusetts, Maine, Vermont and New Hampshire also will be served by direct factory sales from General Electric arc-welding headquarters in Fitchburg.

(*Please turn to page* 956)

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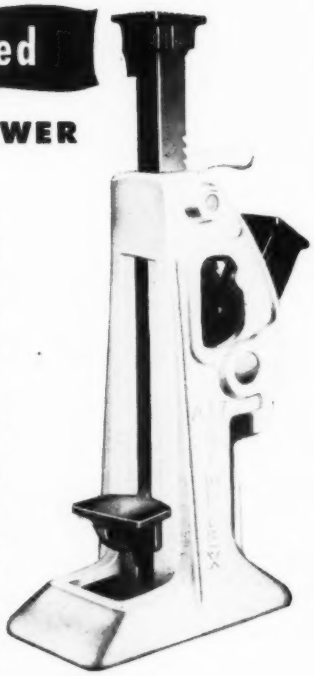

A track jack that's really new! That's the Simplex A17. Made of aluminum alloy for easy portability, yet *engineered* to provide the strength and power of heavier malleable jacks through 40% extra support at stress points. The toe lifting area has been *increased more than 100%* (2½" x 3¼") to permit jacking under ends of tires without damage.

Shorter fulcrum center for easier lifting; new socket and lifting pawl construction to reduce parts replacement. Safety thumbguard protects operator when tripping jack. Lifts full 15 ton capacity on cap or toe; overall height 22¾" with 13" lift. Get complete details in new Bulletin Track 49.

FOR TAMPING, SURFACING, LINING

No. 15A Universal Track Jack

This new Simplex Track Jack speeds tamping, surfacing and lining. Enlarged toe lift 2½" x 3¼" permits lifting at end of ties without cutting into bottom and tamping through the complete panel without interference. Minimum height of toe lift is 2¼". Capacity of jack is 15 tons; overall height 11" with 5" lift. Complete specifications, sketches showing operation in new Bulletin T&B 48S.

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Supply Trade News (Cont'd)

Mack Welding Company, Duluth, Minn., has announced that it has been authorized to offer the "Thermit" welding process in the Lake Superior region.

Chain Belt Company, Milwaukee, Wis., has opened a new district office at 2900 W. Clay St., Richmond 21, Va., with **Fred C. Taylor** as district manager.

American Steel & Wire Co., Cleveland, Ohio, has announced the organization of a separate sales division to handle its electric wire and cable products. Headquarters of the new division will be in Cleveland, with district offices in Boston, Mass., Cleveland, Chicago and New York.

Personal

Jack Gould has been appointed railroad representative of the **Marvel Equipment Company** in the Chicago territory to succeed the late **Andy Anderson.**

Max Bradshaw has been appointed district manager for the Tractor division of the **Allis-Chalmers Manufacturing Company.** Mr. Bradshaw's territory will consist of the states of Ohio, West Virginia and western Pennsylvania.

Edson K. Green, assistant sales manager of the **International Salt Company, Inc.,** has been promoted to general sales manager at Scranton, Pa.

H. E. Donovan, formerly assistant engineer in the water service department of the Chicago, Milwaukee, St. Paul & Pacific, has been appointed vice-president in charge of sales of the **T. W. Snow Construction Company,** Chicago.

Charles F. Reade, formerly general sales manager of the Reade Manufacturing Company, has been advanced to vice-president of the firm, which has recently become the **Reade Manufacturing Company, Inc.**

Whitley B. Moore, formerly director of all sales of the **Timken Roller Bearing Company,** has been elected vice-president in charge of sales, succeeding **L. M. Klinedinst,** who has retired.

J. A. Brownell, assistant to the manager of the railway traffic and sales department of the **Texas Company,** has been promoted to assistant manager of that department. Mr. Brownell joined Texaco in 1907 as a clerk in the Southern sales territory at Dallas, Tex., and has served as assistant to the manager of the railway sales department since 1923.

M. B. Garber, assistant sales manager and export manager of the **Thew Shovel Company,** Lorain, Ohio, has been promoted to general sales manager to succeed **Don G. Savage,** whose death is noted elsewhere in these columns. **Q. J. Winsor,** assistant to the general sales manager and district manager for the East-Central territory, and **J. T. Cushing,** district sales manager for the West coast, with headquarters in San Francisco, Cal., have been appointed assistant general sales managers.

(*Please turn to page 960*)

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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September, 1948

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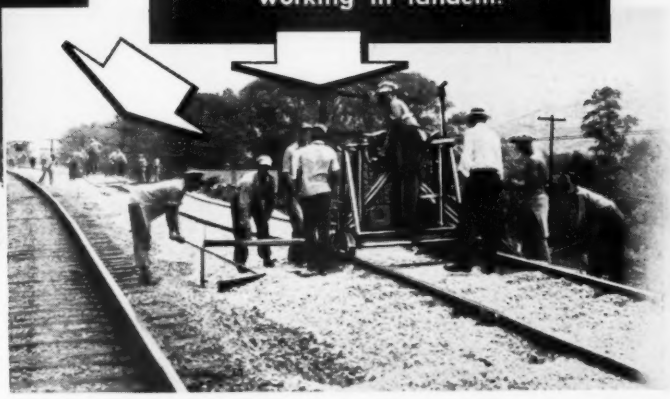
Reballasting Project Speeded Up WITH NORDBERG POWER JACKS

A section of ballasted track raised with two Nordberg Power Jacks.



Two Nordberg Power Jacks working in tandem.

• Sixty-nine miles of double track converted from cinder to stone ballast is a big reballasting program but an easy raising job for two Nordberg Hydraulic Power Jacks. This involved an eight inch minimum raise and required about 214,000 tons of stone ballast. The jacks worked in tandem about 100 feet apart, the lead jack raised adjacent to each grade stake, the second jack raised the intermediate section of track. An operator and four laborers were assigned to each jack, the laborers fork tamping the ends of the ties sufficiently to hold the track temporarily at the new grade.

The Nordberg Power Jack raises both rails simultaneously or each rail separately, thus making it possible to raise each rail to correct elevation with respect to the other. The lifting action is accomplished by means of hydraulic rams, the lift being smooth and accurate, resulting in faster lifting and at a big saving in labor and expense as compared with hand methods.

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ADZING MACHINE • SPIKE PULLER • TRACK WRENCH • SPIKE HAMMER
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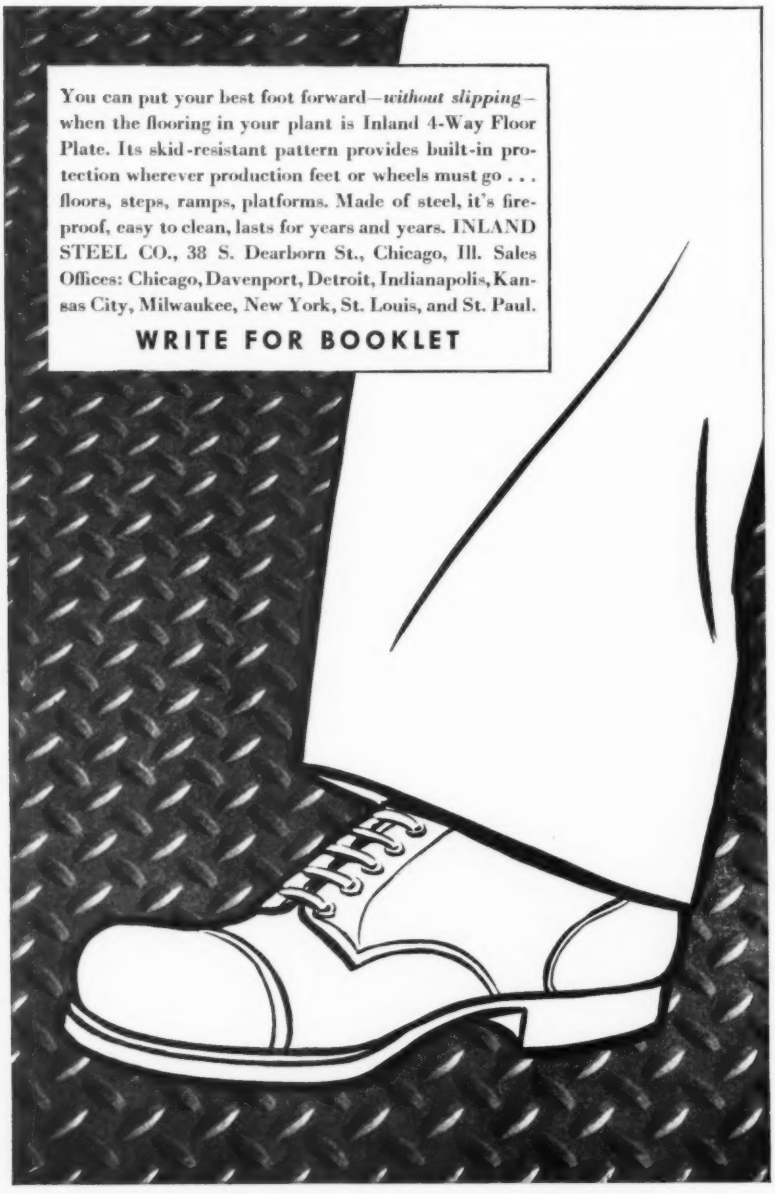

You can put your best foot forward—*without slipping*—when the flooring in your plant is Inland 4-Way Floor Plate. Its skid-resistant pattern provides built-in protection wherever production feet or wheels must go . . . floors, steps, ramps, platforms. Made of steel, it's fireproof, easy to clean, lasts for years and years. INLAND STEEL CO., 38 S. Dearborn St., Chicago, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, and St. Paul.
WRITE FOR BOOKLET

INLAND

Stocked by Leading Steel Warehouses

4-WAY FLOOR PLATE

Supply Trade News (Cont'd)

Donald A. MacNeil has joined the **Butler Manufacturing Company,** Kansas City, Mo., as special representative for railroads, with headquarters at 624 South Michigan avenue, Chicago.

S. Wayne Hickey, vice-president of the Simmons-Boardman Publishing Corporation and, heretofore, district manager of advertising sales, transportation papers, with headquarters at Chicago, has been

S. Wayne Hickey

named vice-president, advertising sales, transportation papers, a newly created position. Mr. Hickey will have offices in both Chicago and New York. **C. Miles Burpee,** vice-president of the corporation in general charge of advertising sales on the transportation papers, has been named

John R. Thompson

vice-president, sales promotion and service, transportation papers. His headquarters will be at New York as heretofore. He will continue also as business manager of *Railway Age* and will be publicity director of the company's transportation cyclopedias. **John R. Thompson,** formerly vice-president and treasurer of the Maclean-Hunter Publishing Corporation, with headquarters at Chicago, has been appointed district manager of advertising sales, transportation papers, at Chicago, succeeding Mr. Hickey.

Mr. Hickey was born at Camden, Ark., on December 7, 1905, and received his

(*Continued on page* 962)

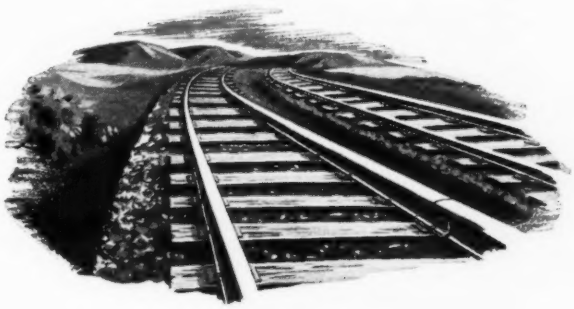
More and Better Tamping for Less Money

with BARCO

It doubles a man's output . . .

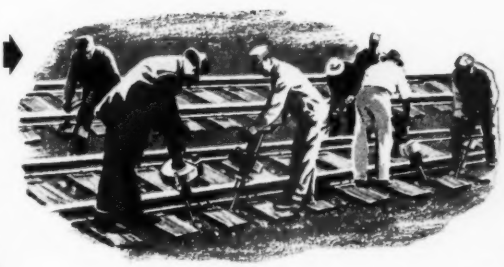
BAR OR HAND TAMPING

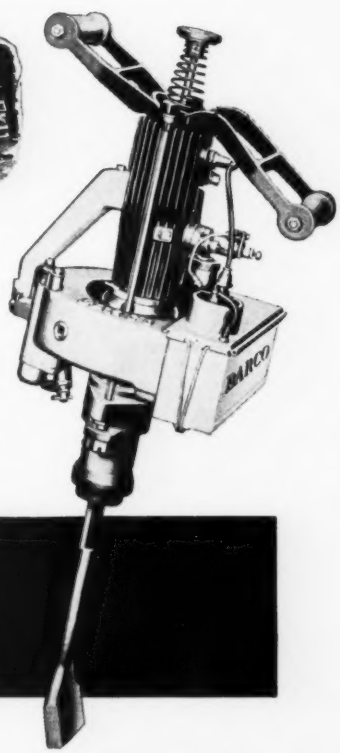
BARCO TAMPING



Does more uniform and lasting work . . .

Is used not only for spot tamping but can be bunched for out-of-face surfacing





Light in weight and correctly balanced, the Barco is self-contained, providing easy portability on busy right-of-ways, eliminates need to remove ballast between the ties. As speeds increase and loads grow heavier, more and more railroads depend on Barco as their most efficient tamping tool. For more detailed information, write to Barco Manufacturing Company, 1805 Winnemac Ave., Chicago 40, Ill. In Canada: The Holden Co., Ltd., Montreal, Canada.

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RUST-OLEUM CORPORATION
2417 Oakton Street **Evanston, Illinois**

Supply Trade News (Cont'd)

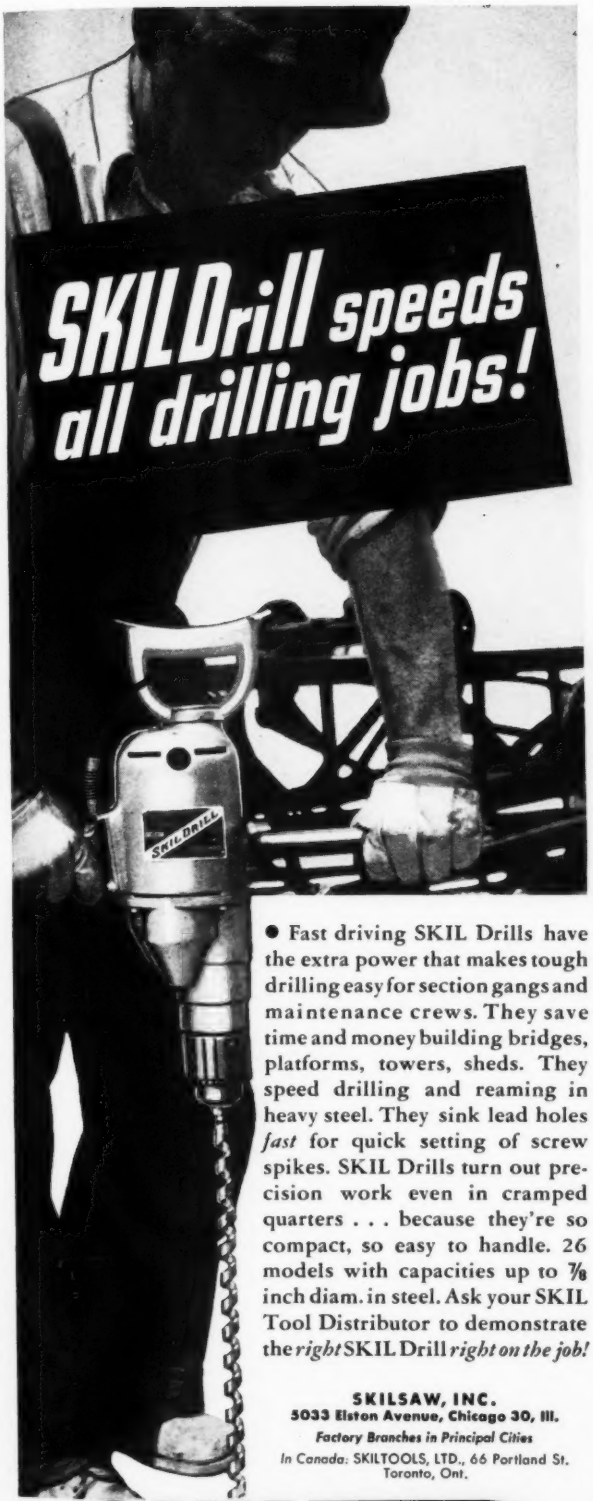
higher education at the University of Arkansas. He entered railway service in April, 1925, as a gravel and ballast inspector on the Illinois Central, subsequently serving as chainman, rodman and valuation accountant on that road. In April, 1931, he became associated with Simmons-Boardman as a member of its circulation department, at Chicago, and in December, 1936, he was advanced to advertising sales representative. Mr. Hickey was promoted to business manager of *Railway Engineering and Maintenance* and western manager, advertising sales of Simmons-Boardman, in September, 1944. He was elected also vice-president of the firm in February, 1946.

Mr. Thompson, who was born on July 23, 1900, and educated at the University of Toronto, has devoted his entire business career to the newspaper and business publishing fields. Immediately upon leaving college in 1918 he became assistant financial editor of the Toronto Globe, with headquarters at Toronto, Ont., and from 1920 to 1923 he was a junior account executive in the advertising agency of A. McKim Ltd., at Toronto. The following year he became advertising manager of Consolidated Press, at Toronto. In 1925 Mr. Thompson went with the Maclean-Hunter Publishing Corporation and for 13 years was manager of its Chicago office. During the next three years he was advertising manager of Maclean's magazine, with headquarters at Toronto, and in 1940 he returned to Chicago as vice-president and treasurer of the corporation in full charge of the publishing activities of its business journals (Inland Printer, Chemical Industries, Rock Products) in the United States. He was holding these positions at the time of joining the staff of Simmons-Boardman as district manager of advertising sales, transportation papers.

B. W. Bennett, manager of the New York district sales office of the **American Steel & Wire Co.,** Cleveland, Ohio, has been promoted to assistant to the vice president—sales and will handle special assignments in the New York territory. **Walter E. Mackley,** manager of manufacturers' products sales in New York, has been appointed manager of the New York district sales office to succeed Mr. Bennett.

The following changes in its sales organization have been announced by the company in connection with the establishment of a separate sales division to handle electric wire and cable products. **T. F. Peterson,** formerly head of electric products section of the general sales staff becomes manager of sales of the new

(*Continued on page* 964)



● Fast driving SKIL Drills have the extra power that makes tough drilling easy for section gangs and maintenance crews. They save time and money building bridges, platforms, towers, sheds. They speed drilling and reaming in heavy steel. They sink lead holes *fast* for quick setting of screw spikes. SKIL Drills turn out precision work even in cramped quarters . . . because they're so compact, so easy to handle. 26 models with capacities up to ⅞ inch diam. in steel. Ask your SKIL Tool Distributor to demonstrate the *right* SKIL Drill *right on the job!*

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ELECTRIC **SKIL Tools** PNEUMATIC
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- YOUR WATER LOSS
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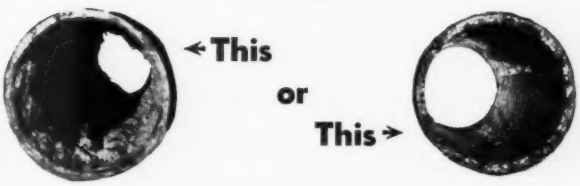
WE CAN SHOW YOU



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An engineering survey of your complete piping system.

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To determine hydraulic efficiency of a system.

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An engineering service designed to determine the condition and serviceability of your sewers.

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Complete engineering service to design new systems or to enlarge and improve old ones.

And now . . . A complete survey of your water supply and disposal problems.

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Through a close control of the current surge which results from low or momentary high overload, PIERCE Fuses keep your production line humming. No unnecessary shutdowns . . . no lost labor time . . . no production sag, when PIERCE Fuses are in your plant!

Here's how PIERCE Fuses produce cost-saving Surge Control:

BALANCED LAG LINK — creates more lag at low overloads — where it is necessary and harmless; gives **Safe** lag at high overloads.

SCREEN VENTILATION —takes in cool air and allows escape of heat and gases, reducing unnecessary fuse blowing and banishing dangerous "afterblow".

GET THE FULL STORY of the cost-saving Surge Control features of Pierce Renewable Fuses. Write for descriptive folder--today!

Supply Trade News (Cont'd)

division, with headquarters as before at Cleveland. **C. H. Eisenhardt** will serve as assistant manager of sales. District managers of the new division, with their headquarters, are as follows: **C. H. Currier,** Boston, Mass.; **V. W. Heimberger,** Cleveland; **R. H. Coates,** Chicago; and **C. M. Vaill,** New York. At the same time, **Curtis E. Plass,** Chicago; **Walter P. Lewis,** Pittsburgh, Pa., and **Harry E. Purdy,** New York, were appointed district electrical sales engineers.

Mr. Peterson joined the American Steel & Wire Co. as a cable engineer in the New York office, and in 1936 became director of the Electrical Cable Works at Worcester, Mass. In 1941 he was transferred to Cleveland as director of electrical cable engineering and research, later becoming head of the electrical products section of the general sales staff, the position he held at the time of his recent appointment.

Fred C. Foy, whose appointment as vice-president and manager of the sales department, central staff, of **Koppers Company,** with headquarters at Pittsburgh, Pa., was reported in the August issue, was born in San Francisco, Cal., 43 years ago and was graduated from the University of California. He began his business career as manager of the public relations department of Joaquin Light & Power Corp., Fresno, Cal., and joined the J. Walter Thompson Company in 1930. He subsequently served as advertising manager for the Shell Oil Corporation and as account executive with Young & Rubicam, Inc. During the war he was a colonel in the Army Service Forces, serving first as assistant director and later as director of the purchases division. He returned to the Thompson Company in November, 1945, as manager of the Detroit, Mich., office, and was holding this position at the time of his recent appointment.

Obituary

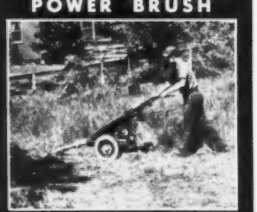
Albert G. Bladholm, president of Iron & Steel Products, Inc., Chicago, died on July 6, at the age of 43. Mr. Bladholm, who was one of the co-founders of Iron & Steel Products, served as secretary of the company from its incorporation in 1930 until 1942, when he was elected president.

Don G. Savage, vice-president and general manager of the Thew Shovel Company, Lorain, Ohio, died on July 25 of a heart attack. Mr. Savage, who was 50 years old, was also a member of the company's board of directors. He started to work for Thew 28 years ago, serving successively as a clerk, sales representative, Southeastern sales manager and general sales manager. His appointment as vice-president came only 10 days before his death.

Cut the cost of RIGHT-OF-WAY and STATION MAINTENANCE with GRAVELY *POWER* EQUIPMENT!

48" SNOWPLOW

POWER BRUSH


MOWER

SNOW REMOVAL . . . Clear docks, platforms and drives quickly with the 48" Snow Plow Attachment for the powerful 5-HP GRAVELY. One Snow Plow does the work of eight men—proved in user tests.

POWER SWEEPING . . . Keep stations, walks and drives shining with the Rotary Brush Attachment. 38" of sweeping width, replaceable brush segments, gear driven. Sweeps CLEAN the first time over.

MOWING . . . Mow right-of-ways and lawns economically with the GRAVELY mowing attachments. Rotary Mower for station lawns, Sicklemower for right-of-ways. Extension axles allow efficient work on 60 degree slopes.

SAVINGS in maintenance cost are an old story to GRAVELY users. Ask us for details about our 17 attachments. SERVICE is always available, anywhere, for the GRAVELY . . . and the GRAVELY has a REVERSE, DIRECT GEAR DRIVE, 5 HP.

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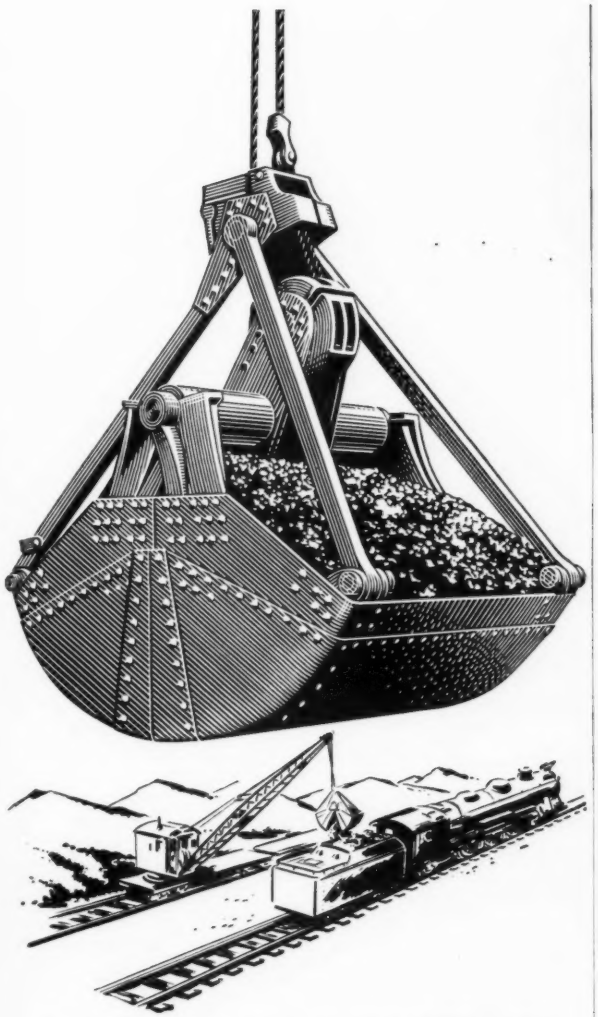

BUSY BUCKETS

For *the railroads* Blaw-Knox builds buckets that are kept busy on many jobs . . . fueling engines, rehandling from stock piles, ash pit service, ballast rehandling, barge clean-up, etc. For a quick appraisal of Blaw-Knox Buckets widely used for railroad work, write for Bulletin 1989.

BLAW-KNOX DIVISION
of Blaw-Knox Company
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Pittsburgh 22, Pa.

You can select *the bucket you need* from this catalog.

BLAW-KNOX BUCKETS

RACINE Portable RAIL SAWS

For any Rail Cutting Job

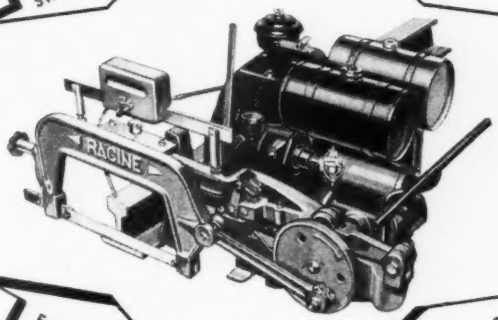
IN TRACK OR SHOP

Today's users of RACINE portable RAIL SAWS are continually enjoying the many economies made possible by RACINE'S faster and more accurate method of rail cutting. Here is a one-man tool that substantially reduces time and costs per cut. 100 lb. rail can be cut in an average of 5 minutes. 130 lb. rail in 7 minutes.

FOR CUTTING AND FITTING RAILS AT INTERLOCKING PLANTS, CROSSINGS AND SWITCHES.

FOR CLOSING OF TRACK IN RAIL LAYING OPERATIONS

FOR ACCURATE AND FAST CUTTING OF RAILS FOR INSULATED JOINTS



FOR PROPER STAGGERING OF JOINTS AND CURVES

FOR REMOVING SPLIT OR BATTERED RAIL ENDS

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Racine Rail Saws are truly portable. They can be easily transported by two men. Only one man needed to operate. Saw blades are of special alloy steel developed to assure maximum speed and cutting economy. Cuts as thin as 3/10 of an inch can be made quickly and accurately. Models are available with gasoline, electric or compressed air motors. Write today for complete Catalog. Address Racine Tool & Machine Co., 1738 State St., Racine, Wisc.

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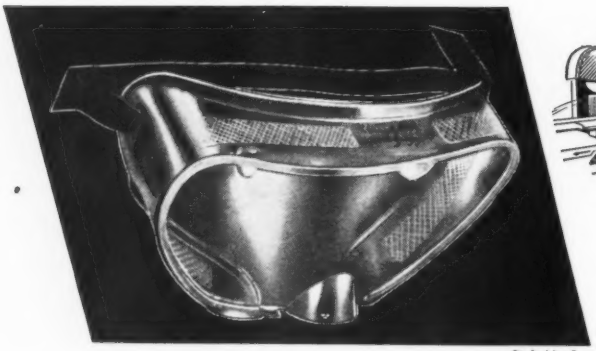

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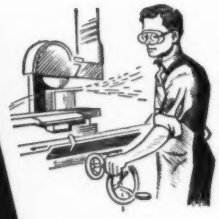

TWO NEW MONOGOGGLES for Show Window Vision

New, deeply cupped styles have ample room for wearing prescription glasses in comfort. The flat style provides added clearance for molded spectacle frames. Large, one-piece, plastic lens in new drop-eye shape provides wider vision. Frames are of clear acetate or flexible, mottled-brown polythene. Their lightweight and excellent impact resistance give workers all-day comfort and ample eye protection on a variety of hazardous operations.

Choice of Flat Lens or Curved Lens.

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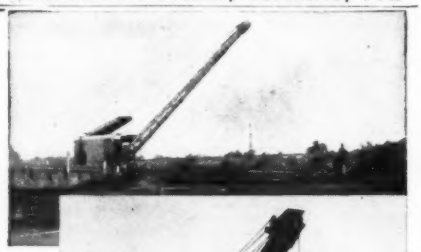
LARGE or SMALL . . .

BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY



Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only BURRO *cranes have:*

- *Fast travel speeds—up to 22 M.P.H.*
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- *Elevated Boom Heels for working over high sided gondolas.*
- *Short tail swing—will not foul adjoining track.*
- *Low overall height—Burro can be loaded and worked on a standard flat car (see illustration).*

EXHIBITOR — BRIDGE & BUILDING TRACK SUPPLY — Association — HOTEL STEVENS, CHICAGO SEPT. 20-21-22, 1948

Write for Bulletins

Burro WORK Power means more EARNING Power

CULLEN-FRIESTEDT CO.
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Trade Publications

(To obtain copies of any of the publications mentioned in this column, use postcards, page 957)

Concrete Floor Repairs—The Smooth-On Manufacturing Company has published a four-page illustrated leaflet describing its quick-hardening iron cement for patching floors. This bulletin explains and illustrates the application of this cement, which is called Smooth-On No. 7-B, and is described as iron-hard, dust-free and oil-proof.

Raco Power Tools—The Railroad Accessories Corporation has published a 20-page booklet dealing with its Model C power track wrench, the Raco tie boring machine and the Everett power M-W drill. The bulletin, which is liberally illustrated, gives the dimensions of the various units, and also describes their construction and operation.

Steel-Sheet Piling—A four-page pamphlet describing its new lightweight interlocking steel sheet piling has been issued by L. B. Foster Company. This bulletin, No. F-110, gives the advantages, physical characteristics, suggested applications, etc., of its high-strength, box-type corrugated piling, which is said to be especially suited for use where heavy piling is not necessary.

Mall Tool Catalog.—A new catalog illustrating and describing its complete line of portable power tools has recently been published by the Mall Tool Company, Chicago. The catalog also lists a number of interchangeable attachments with which many Mall tools may be converted to a variety of other uses. Complete construction and performance specifications are given for every tool listed. The catalog is designated as Form 746.

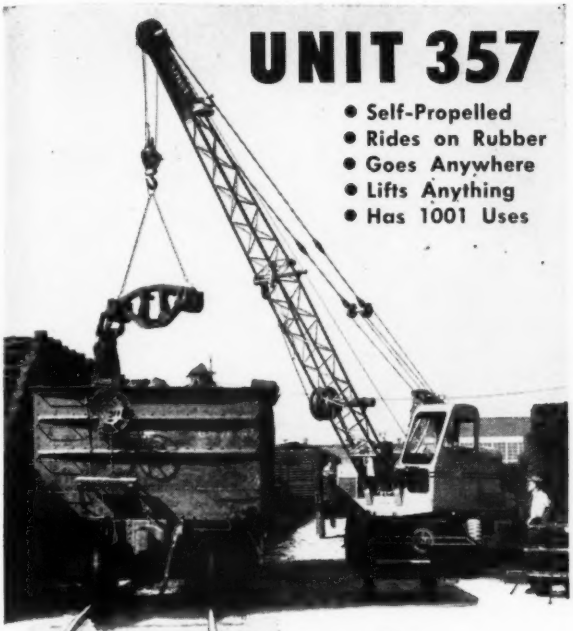
Metal Roofing—The International Nickel Company has issued a 24-page bulletin describing its new, soft-temper Monel roofing sheet. The booklet, which is printed in two colors, discusses the causes and prevention of roof failures, and contains numerous photographs of buildings with Monel roofs. The last section of the book shows how Monel can be adapted to current architechtural and roofing designs and practices.

Caterpillar Tractor—A 32-page, illustrated booklet describing its D4 tractor has recently been released by the Caterpillar Tractor Company. Printed in two colors, the catalog contains engineer's drawings, cutaway sectional drawings and retouched photographs of the working parts of the tractor, with explanatory material giving the salient points of manufacture.

Industrial Uses for Caterpillar Diesels—This is the title of a 16-page, two-color booklet recently published by the Caterpillar Tractor Company. The book describes and illustrates the use of dozer-equipped track-type tractors in a variety of jobs such as stock-pile handling, spotting of heavy equipment in and around a plant, earthmoving, etc. It also tells how Caterpillar Diesel engines can be used to power shovels, draglines, cranes, compressors, locomotives, ditchers, etc., built by other manufacturers.

UNIT 357

- Self-Propelled
- Rides on Rubber
- Goes Anywhere
- Lifts Anything
- Has 1001 Uses



Inside of Yard
Outside of Yard
On the Tracks
Off the Tracks

UNIT 357 handles easily...Works efficiently in close quarters.

The ideal machine for right-of-way maintenance . . . railroad shops . . . or stores departments. Ready for action with a push of the starter. Cuts maintenance costs to rock bottom. Fully convertible. Gas or Diesel power. Ask for literature.

Operated by ONE man . . . Powered by ONE engine . . . Controlled from ONE position in UNIT's safety-promoting FULL VISION CAB.

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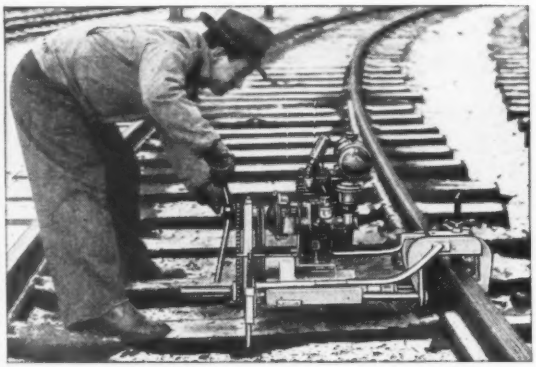

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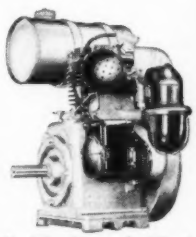

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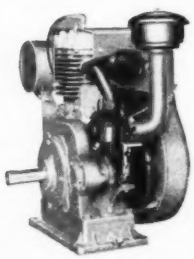

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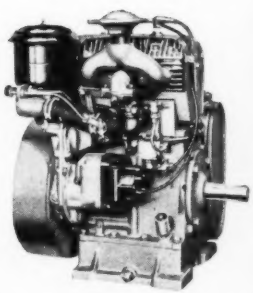

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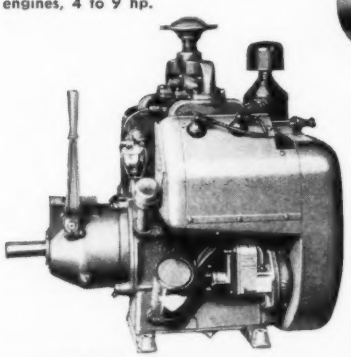

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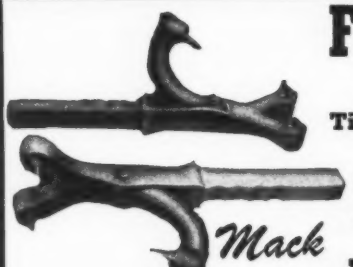

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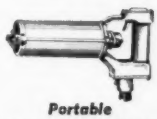

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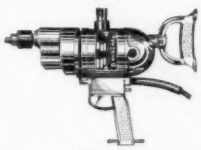

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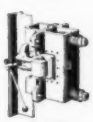

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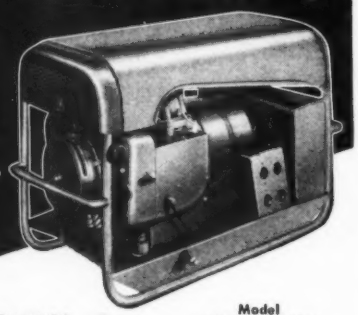

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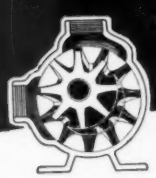

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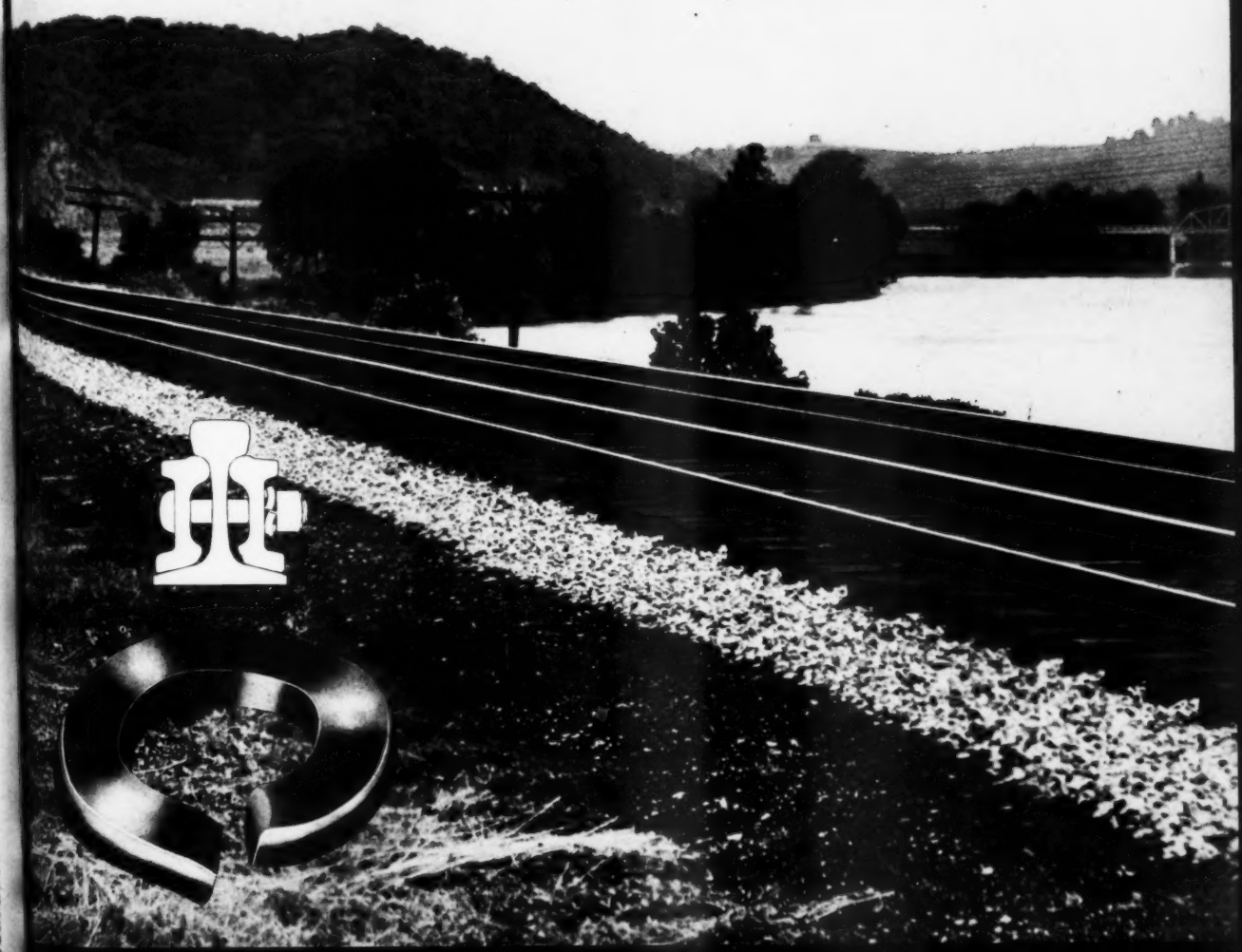

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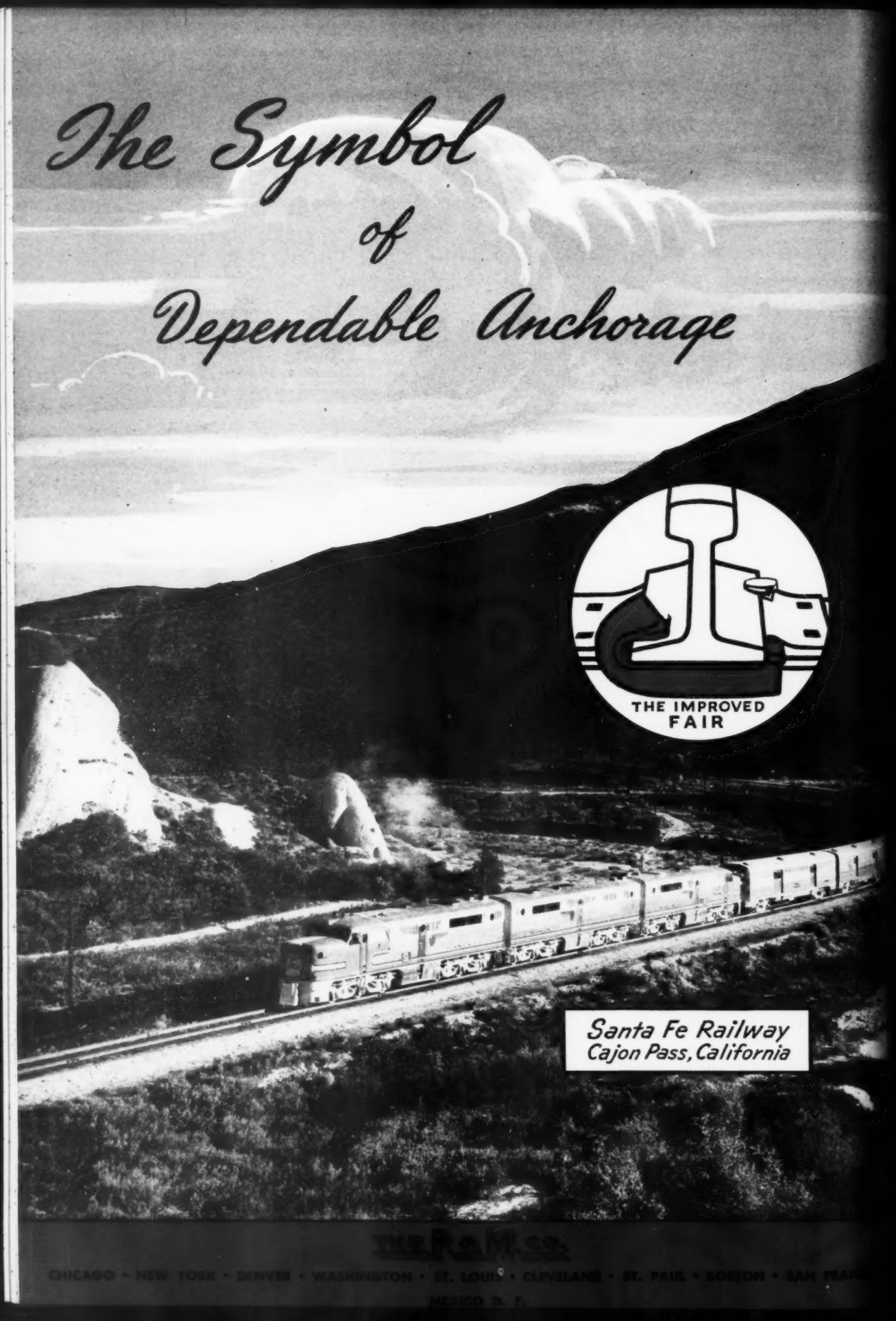
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